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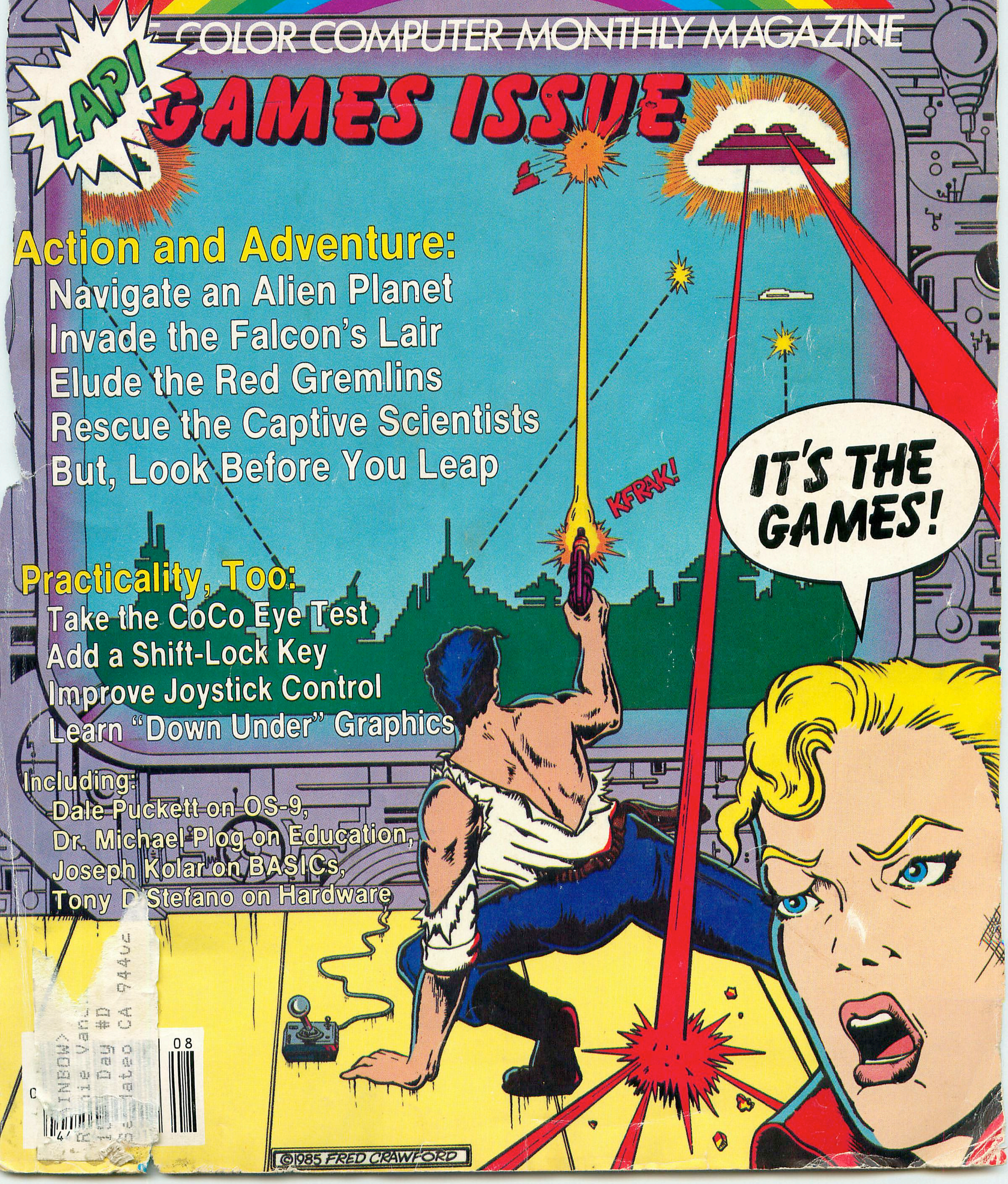
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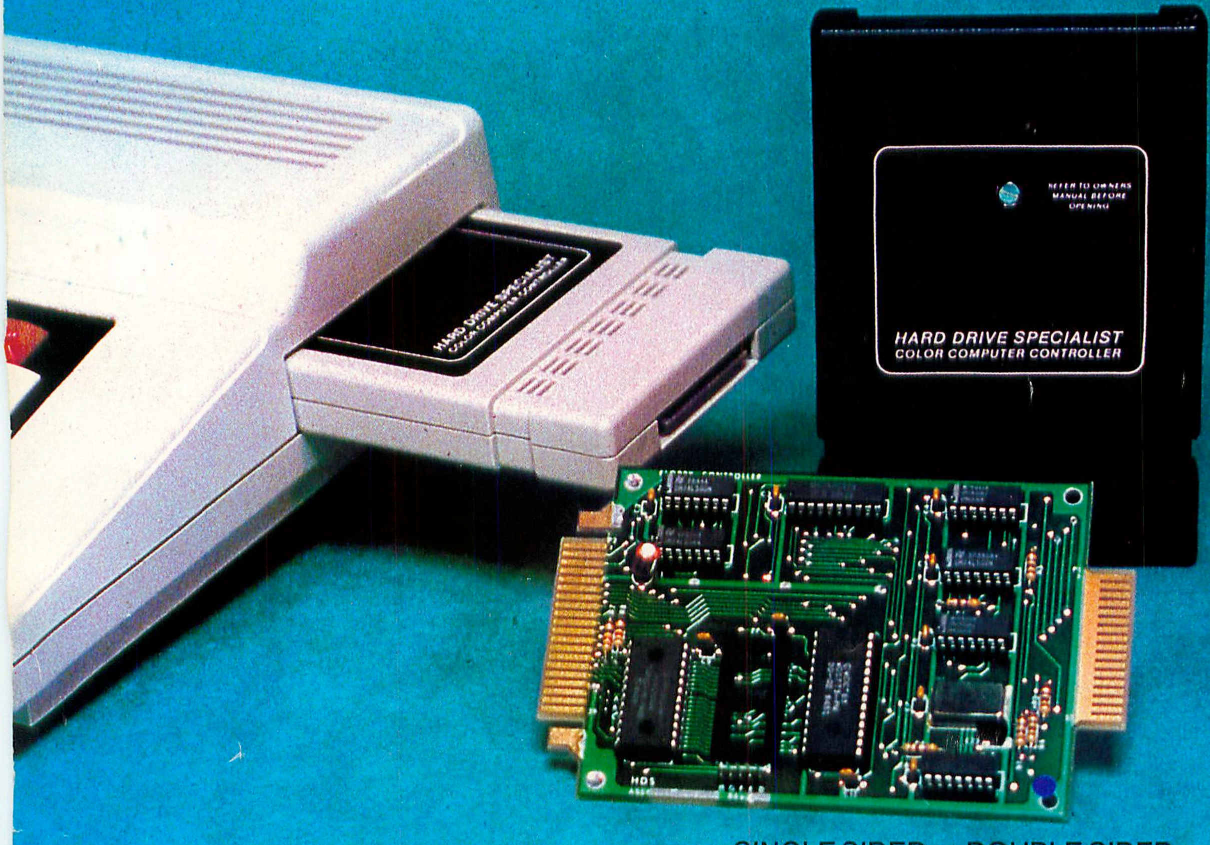
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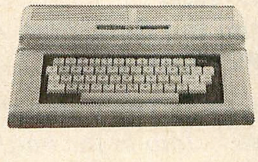

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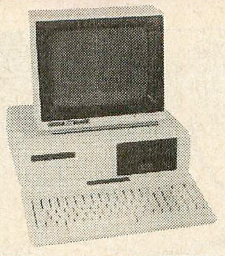

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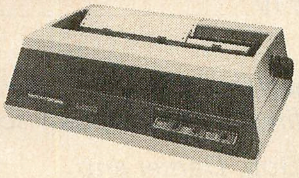

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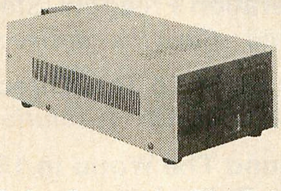

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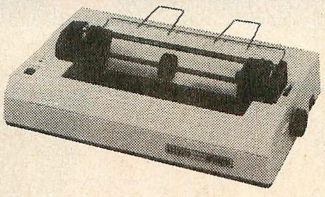

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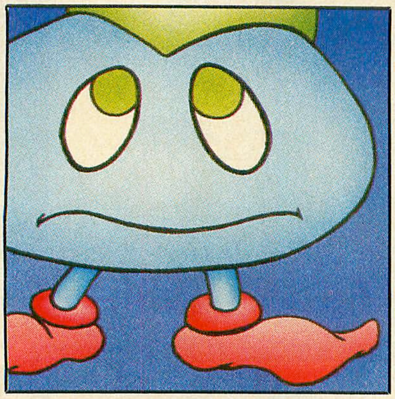
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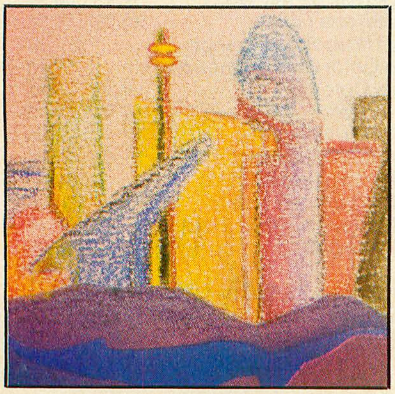
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📼 The small cassette tape symbols beside features and regular columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE, ready to CLOAD and RUN. For full details, check our RAINBOW ON TAPE ad on Page 97

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NEXT MONTH: Ease back into "school daze" with our Education Issue. We'll feature educational material for everyone from preschoolers to post graduates — programs to improve your math and vocabulary skills, some to learn from and even a few to aid the teacher. Take a health lesson with *Heart Quiz*, then a quick course in astronomy with *Starfinder*. For geography buffs, there'll be a program with a quiz on the capital cities of Canada.

Even if you're a Rhodes scholar, you'll find something to interest and intrigue you with all of THE RAINBOW's regular columns, utilities, games and reviews. For a wealth of CoCo knowledge, don't miss us in September!

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August 1985 Vol. V No. 1

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LETTERS TO THE RAINBOW

Postalcommunications?

Editor:

I am a victim of the world of telecommunications. I live in a small town in southeast New Mexico where most people don't even know what a modem is. I am interested in meeting people through telecommunications. If anybody is interested, please write me at P.O. Box 502, 88119.

Kenny Berard
Ft. Summer, NM

On the Air

Editor:

I would like to contact other amateur radio operators who are using *Graphicom's* SSTV mode or the *WEFAX* facsimile program [February 1985, Page 42] for transmission of pictures on the HF ham bands.

Please contact me at P.O. Box 32215, 95152 or on the air at 00:00 GMT on Monday (Sunday local) on 7.260 MHz during the SPEEDX net. Thank you and 73!

J. Michael Nowicki
San Jose, CA

A Good Companion

Editor:

I would like to begin by saying how much I enjoy your magazine. I find it very interesting and a very good companion.

I am a quadraplegic and have just started to find enjoyment from your magazine. A very good friend of mine has made it possible for me to operate my own computer by designing a table that fits on my wheelchair so the computer is stablized. It has a wooden handle that enables me to hold down the SHIFT key which allows me to use the different functions of the computer keyboard by holding a pencil in my mouth.

Once again I would like to say keep up the good work with helping people to understand computers.

If anyone is interested in the design of my special computer table, I certainly would send the design to them. My address is P.O. Box 901, Canada, N0K 1W0.

Alf C. Dale
Seaforth, Ontario

Catering to Cassette Users

Editor:

May I put in a word for those of us who do not have disk drives? We enjoy the CoCo, too, and are always glad to see a program that works with tape. Sometimes a program written for disk can be made to work with tape with just a few minor modifications. Could program authors be encouraged to include these modifications in the documentation?

As I write this letter, it occurs to me that one of your readers may have written the type of program that would convert printer codes. If such is the case, I sure would like to hear from him or her. Write to me at 17212 Brunswick Blvd., Canada, H9J 1K9.

Keep up the good work! I can't wait for a Canadian RAINBOWfest. Why not consider Montreal? CoCo enthusiasts would love this city.

Gerald Carroll
Kirkland, Quebec

Going out of 'Style'

Editor:

This is in response to Larry Geiger's letter to THE RAINBOW published in the April 1985 issue [Page 6] concerning Mr. Witham's article "To Pack Or Not To Pack."

Style in programming is what one worries about if one is writing the program for the review and amazement of one's contemporaries. The kernel of good programming is to convert an idea into a machine readable form such that the machine will then produce the desired output in the fastest and most efficient manner possible.

The magical abilities ascribed to C and PASCAL compilers, by Larry Geiger, such that they somehow do not waste either memory or disk space to store unnecessary lines or space-filled lines is wondrous. Of equal wonder is their ability to ignore those extra lines and spaces without using processor cycles to read and decide to ignore them. These mystical qualities, I'm sure, would amaze the programmers who wrote the interpreter sections for the compiler programs.

If enough young people come to believe that compilers work in some magical way and do not strive to train their minds to program in frugal and efficient methods, no matter which machine they are using, someday no one will be able to produce compilers, or for that matter, any other software of value.

The microprocessor industry has already recognized early mistakes that produced horribly time-inefficient processors and are quickly moving to RISC (Reduced Instruction Set Computer) designs to improve cycle efficiency. Soon maybe the firms that are now producing software such as operating systems written in high level languages, such as C and PASCAL, will also mend their ways and stop filling up our disks and memories with slow running trash.

Thanks for the use of your "soapbox."

D. J. Leffler
Cocoa Beach, FL

Take Heed!

Editor:

On February 25, 1985, I mailed the United Color Computer Club (10117 S.W. 53 Court, Ft. Lauderdale, FL 33328), later listed in the brochure mailed to me as the "Worldwide Color Computer Club," my check in the amount of $30 for a one-year membership. Upon receiving no answer, I wrote to them on April 3, and again received no answer. Also, Michael Fahy of Central City, Pa., mailed them a check in the amount of $30 and has to date received no response. We both have our canceled checks endorsed "United Color Computer Club" and a "#654978 For Deposit Only" to the account of Hollywood Federal Savings & Loan Assoc., teller 202.

I am reporting this to you in the hope that other RAINBOW subscribers would be alerted about this matter. Also I am going to report this to the postal authorities to see if this can be stopped and/or action instituted.

Joe F. Sobieski
Johnstown, PA

Programming Cahoots

Editor:

I'm looking for CoCo pen pals who would be interested in co-authoring some original programs with me. I can develop programs easier than I can come up with the ideas for them. I'd like to hear from other programmers who may have ideas, partial programs or completed programs that may need finishing touches. Together, maybe we can come up with a few good programs suitable for submission to THE RAINBOW. BASIC programs only, please. I don't know that much about machine language programming.

Interested parties can contact me at 708 Michigan Avenue, 53081.

Bill Bernico
Sheboygan, WI

INFORMATION PLEASE

Editor:

In your March 1985 issue of RAINBOW magazine I read in "Letters To Rainbow" on Page 6 your advice to a reader whose disk drive was not working to acquire a head alignment kit. Could you advise as to where I could acquire such a kit and, if possible, the price of one? I would appreciate any help you can give me.

John Ganiel, III
Cologne, NJ

Editor's Note: A head alignment kit can be purchased at any Radio Shack store.

Joystick Inventiveness

Editor:

I get a lot out of your magazine. I am getting into electronics and would like to see more hardware articles if possible. Can you tell me in what issue I saw an article on how to build your own joysticks from scratch?

Gilbert T. Allen
Schenectady, NY

Editor's Note: "Cheapstick, A Joy For Under $10" appears in the February 1984 issue on Page 186.

Editor:

Do you have an article on how to make an adapter for using Atari joysticks on the CoCo?

I love your magazine and look forward to it each month.

Daniel Pardue
Gretna, LA

Editor's Note: Please see "Convert Those Paddles" on Page 131 of the August 1984 issue.

See other articles pertaining to joysticks: "Joystick-to-itiveness" (shows the advantages of incorporating joysticks into your programs) appears on Page 232 of the March 1985 issue.

Also, "Wireless Joysticks" (play games with no wires attached), June 1985, Page 105.

Revving Up the CoCo

Editor:

I have a 16K Extended BASIC CoCo and I am into road racing games. Unfortunately, all the racing games I've seen require 32K of memory. Are there any for 16K?

Steve Glezakos
Montreal, Quebec

Editor's Note: "Hi-Res Racer" is a 16K game which appears on Page 124 of the March 1985 issue. Also, see "The Ultimate Program" (Part 2) *Stock Car,* which is part of our Fourth Anniversary gift to you in the July 1985 issue, Page 55.

A Hole in One

Editor:

I am very interested in finding a program to handle golfers' scores and handicaps. If you have a program of this sort, could you send it to me? If you don't have one, is there anyone who does have one? Write to me at Box 493, Canada, S0A 2X0. I have a 64K CoCo and a disk drive.

G. Young
Esterhazy, Saskatchewan

Editor's Note: You just scored a hole in one! See Page 215 of this issue for the review of Don Hug's program, *Golf Handicaps.*

Counting Calories

Editor:

I have been a subscriber for over a year and RAINBOW has taught me more about my CoCo than any other publication I have ever read. It has also provided me with many useful programs.

My wife and I have become very calorie conscious, not unlike millions of other Americans. I don't know how to program in BASIC, although I am getting more familiar with the language. Are you planning to publish a program that will enable me to enter the caloric value for items of food and drink that we prefer, and then when I would enter a daily menu, provide me with a calorie countdown or total? Or, do you know of anyone marketing such a program? I have a 32K ECB CoCo.

Len Zielinski
Niles, IL

Editor's Note: Color Connection Software has a program called *DIET-ADE.* See the review on Page 206 of the May 1985 issue. Also, read our July 1985 "Received and Certified" for information on *Nutriguide* by Homesoft Company.

CoCo Checkmate

Editor:

In short, I like your magazine greatly!

Can you please help me? I am looking for a program with the game of chess on cassette for one player.

C.A. Bailey
Oneida, TN

Editor's Note: Read the review of *Cyrus World Class Chess,* by Radio Shack, in this issue on Page 195. Also, *VOX CHESS* by Computerware — a review appears on Page 195 of the July 1985 RAINBOW.

Editor:

Could you please tell me if you have printed or know of a program that teaches chess, or is a game-playing program available on tape for the CoCo?

W.W. Reed
Midway, WA

Editor's Note: Computer Systems Distributors sells *CHESSD:* A Real CoCo Chess Program. See the ad in the June 1985 issue on Page 227.

Taking Care of Business

Editor:

In response to the letter from Sam Cerami [Page 7] in the June 1985 issue, I have the exact equipment that he has, and being new to the computer world, have found the Tandy *Color Profile* allows me to do all the stock and tax record keeping that is necessary. In addition, I use the *VIP Library* for profit and loss analysis.

If he has either or both of these programs, I would be happy to share with him the formats I have used to do this work. I also have found some excellent books on these subjects.

I really enjoy RAINBOW, although being a newcomer, I still do not understand a lot of what I read in the articles. My desire to use the computer rather than write programs has led me to purchase programs to fit my needs. I have, therefore, used your reviews to help me pick the right programs.

Write to me at 2344 E. Encarto, 85203.

Joe Zagar
Mesa, AZ

Regards to RAINBOWfest

Editor:

I think everyone should give Lonnie Falk and his supporting staff a big round of applause for an outstanding RAINBOWfest-Chicago. It was a pleasure being able to see the people you only hear over the phone.

You will have to pardon the expression but, "From East to West, no doubt, RAINBOW is the best!"

Charlie Schneider
Sofco Computer Supply
Downers Grove, IL

HINTS AND TIPS

Editor:

I have faithfully input all of the "One Liners" and have enjoyed them very much. I have them all on one t[illegible] with an index to go along with it. I have done something with it you may want to pass on to others. At the beginning of each, I put:

1. "_ _ _ _ _ _ _ _" (An eight-letter title describing what it is. If it needs joystick, or something special, I also indicate that.)
2. One-Liner by (the name of the person)
3. (The person's city)

4. (Date) 1985 Rainbow Page(_ _ _)
5. (Start of program)

This way, if I run into a problem, I can quickly look up the page in the appropriate RAINBOW.

One other thing I have discovered: Some of the One Liners are too long and won't accept the last two or three letters. I found by going to `EDIT 5` and then 'X,' I can add the missing letters without any problem. It may be an eccentricity of my CoCo, and others may not have this problem. I have a 64K ECB.

Thanks for an excellent magazine.

Harvey W. Marks
Lakewood, CO

Unfearful Flying

Editor:

I recently purchased the flight simulator *FLIGHTSIM I* and I have developed an easy method for a safe flight.

Once you've loaded the program and you are at the title screen, set the auto-pilot's heading for the direction you want, then set the altitude at 1,000 feet. Next, push 'F' to turn off the Freeze mode and descend the runway till you accumulate a speed of about 200 knots. Now pull back on the right joystick to take off. Once you're in the air push 'G' to raise the landing gear. Continue to climb until you've reached an altitude of about 250 feet and push 'A' to activate the auto-pilot (you may have to push 'R' for recover if you begin to lose control or stall). The plane will now shift to either side to attain the set heading and will also continue to climb till it reaches 1,000 feet.

After you've sighted an airport and you're ready to land, push 'A' to turn off the auto-pilot. Now push 'G' to lock in the landing gear and slowly descend toward the landing strip, decreasing speed as you go.

For more information write to me at 329 Sunset Drive, 21502.

Scott Geraghty
Cumberland, MD

Editor:

The game *Chopper Assault* (June 1985, Page 28) can be made to run on a disk system very easily. Simply change the variable AS to SA in lines 330, 520, 540 and 760. Also, I'd like to see you print more strategy war games.

Your magazine is far better than any of your competition. Keep up the good work!

Eric Asberry
Mt. Carmel, IL

Penguin Patch

Editor:

In your February 1985 issue the game called *Penguin Patrol* caught my eye. It is an arcade-style video game but I found it to be a bit hard to play because it doesn't get enough response from the keyboard, so I wrote this patch to make the game respond to the right joystick.

```
28 GOSUB 1000
1000 H=0 V=0
1010 IF JOYSTK(0) <=8 THEN H=-32
     V=0
1020 IF JOYSTK(0) >=55 THEN H=32 V=0
1030 IF JOYSTK(1) <=8 THEN V=-32
     H=0
1040 IF JOYSTK(1) >=55 THEN V=32 H=0
1050 RETURN
```

P.S. Spierenburg
Dollard Dee Ormeaux, Canada

Subroutine for Stalling

Editor:

I'd like to pass on a very short delay routine that has served me well. Include this in the form of a subroutine as follows:

```
10 POKE 275.1
15 IFPEEK(275)=0 THEN RETURN ELSE 15
```

The subroutine can be included in any procedure and will afford the user approximately three seconds of delay if the system is doing nothing else but returning a prompt after the delay. It pokes a one in the high byte of timer and loops until a zero is generated.

Thank you for a superb magazine.

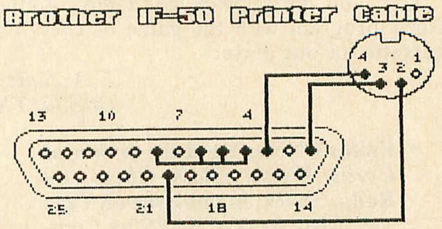
John P. Roberts, Jr.
Savannah, TN

Oh, Brother!

Editor:

Some time back my wife purchased a Brother Correctronic 50 typewriter. We recently purchased the Brother IF-50 Interface which transforms the typewriter into a daisy wheel printer, but we had to build the printer cable ourselves. This proved to be more difficult than expected. After a week of trial and error and some second guessing by friends, one of my friends called Brother. Between Brother and our friend, the printer (a.k.a. typewriter) works great.

In the hope that this might help others who might be in this frustrating situation, I am enclosing a wiring diagram (courtesy of *CoCo Max*) that should be of service. You will need a 4-pin DIN plug (#274-007), a D-Subminiature DB-25 pin male connector and 4+ feet of 3-conductor wire (278-371). CoCo pin 1 is not used. CoCo pin 2 goes to IF-50 pin 20. CoCo pin 3 goes to IF-50 pin 1. CoCo pin 4 goes to IF-50 pin 3. Jumper pins 4, 5, 6 and 8. Set the DIP switches as follows: switches 1, 2, 3 and 6 to on; switches 4 and 5 to off.



Looking from the outside at the RS-232 and RS-232-C jacks.

Dennis O. Dorrity
Fort Ord, CA

BOUQUETS

Editor:

The purpose of this letter is to tell you, for the benefit of your subscribers, about the good service and response I have received from one of RAINBOW's advertisers.

I ordered *LFAST* from D.J. Leffler, based on an ad in the April issue of RAINBOW; within a few days the program and owner's manual were delivered. When I called to get clarification of some questions, I received quick and courteous response. About *LFAST*: It's the greatest thing since sliced bread. I recommend it highly for anyone programming in assembly or machine language.

A.J. Laufer
Chesterland, OH

Editor:

I was delighted with the program called *Lurkley Manor* by Richard Ramella. It is a marvelous piece of work. I hope that one day he will submit a 64K ECB Adventure or Simulation. I know 64K is not as prevalent as 16K or 32K, but once in a while, let's have one for us 64Kers.

Colorware's *Real Talker* and *Talkhead* are beyond belief! They are the best as are Jack Knott's accompanying programs. He backs up his merchandise — I know!

Bob Nevin
Bayside, NY

The Graphics Dump You've Been Looking For

Editor:

This letter is in reply to Brad Williams ["Letters to Rainbow," June 1985, Page 7] and Beau Palmer and all those looking for a screen dump program. In the October 1983 issue of THE RAINBOW there is a graphics dump program by J. Paul Fountain. I use it all the time with my LP VII printer.

I really like THE RAINBOW and read it from cover to cover every month.

David Morgan
Joplin, MO

KUDOS

Editor:

Just a note much overdue to say thank you! I've come a million miles in understanding my CoCo and it's probably 25 percent my part and 75 percent RAINBOW's.

Fred Scerbo and Steve Blyn have taken my children and made their day, and "old mom" sitting at the keyboard gets all the hugs, thanks and, "Gee, you're smart."

It's amazing how Dan Downard can answer my questions before I even get around to sending them in.

RAINBOW allows me to be master of my machine. It is always a great day when the mailman brings my RAINBOW. I only wish it would come more often — 30 days can seem forever when you start feeling the tension of needing another RAINBOW fix.

Kathy Brisbin
Temple, TX

Gallery Votary

Editor:

. . . I think "CoCo Gallery" is a great idea! The Color Computer can do some fancy graphics, and it's about time someone showed them off! . . .

Allen Huffman
Broaddux, TX

Small Investment — Big Return

Editor:

I would like to commend you on an excellent job done in devoting RAINBOW to the Color Computer. I have been a fan of yours for about nine months now. As the proud owner of two Color Computers, I feel that every issue provides a healthy addition to my software library and overall knowledge of the Color Computer. I've spent over $3,000 on hardware and I believe $31 for a subscription to THE RAINBOW is the best investment I've made so far. Thanks for an excellent magazine and keep up the good work!

Mark Daniels
Fargo, ND

BULLETIN BOARD SYSTEMS

Editor:

This letter is to inform your readers of a merger. Colorama Plus of Port Jefferson Station has merged with Colorama of Middle Island.

Both bulletin boards will now be known as Colorama Plus. They are both run on a 24-hour, seven-day-a-week basis. Each system will support X-modem downloads, along with <C>ft for Colorcom/e users. Colorama Plus offers something no other bulletin board offers, we have an online CoCo club, a magazine section, online games, club section, programming hints, corrections to RAINBOW, club newsletter, stop and shop boutique, graphics gallery, downloads, plus a whole lot more.

The board is open to all with limited access to first-time callers. If anyone wishes to join the CoCo Club we are asking for a $10 donation for one year's access to the club section.

The numbers are listed as Colorama Plus of Port Jefferson (516) 331-3718 and Colorama Plus of Middle Island (516) 924-6262.

John Adkins
Colorama Plus Sysop
Mt. Sinai, NY

Editor:

I have established a BBS in my area called The Californian of Ventura. It has the following menu selections: answers, bargains, converse with Sysop, downloads, intelligence, message base, magazine, user log, parameter change, questionnaire, want ads, time view, upload, xpert speed, and sign and update.

Also, the system is dedicated to the CoCo, but other computer users are welcome. The number is (805) 656-7390. It runs 24 hours a day, seven days a week.

Jack Sanders
Ventura, CA

Editor:

I run the only local BBS. The program is widely used in Connecticut and is written by Cliff Skolnick. It works under his own operating system called KDOS64 (this was copyrighted in 1983 and is not related to K-DOS). Cliff is writing an OS-9 BBS in machine code and will be marketing it soon.

People who wish to log into my BBS must send $3 to me in care of The Barn Board along with their name, city and state, type of computer, phone number and an eight-letter password. The BBS does work at 1200 Baud and is open 24 hours a day. Write to 36 Norfolk Road, 06759.

Phone (203) 567-8077 (voice) or (203) 567-4852 (BBS).

Angus Nichelson
Litchfield, CT

Editor:

I would like to announce a new BBS for the Metro Atlanta area. The number is (404) 255-1791. Operating hours are now at night and on weekends.

David Tidwell
Atlanta, GA

Editor:

I would like to announce the Great American Connection BBS. It is up and running 24 hours a day, seven days a week. We have uploads, downloads, want ads, E-Mail, online games and much more. The number is (201) 928-0949.

Michael Jury
Jackson, NJ

Editor:

There is a BBS in New York called Cutthroats BBS. It is a very good BBS with many sub-boards. The number is (914) 737-6770.

Elliot Richman
Hartsdale, NY

Editor:

We are pleased to announce that our BBS, Grand Central Terminal, now supports both 300 and 1200 Baud users.

We have added a Model 100 SIG and a scanner subsection. With popular downloads such as Hi-Res graphics, machine language music files, digitized pictures, printer and disk utilities and our POKE and PEEK file, we are the choice board for Color Computer users in the New York area as well as surrounding areas.

Grand Central Terminal is up 24 hours a day, seven days a week and is a free access BBS in New York City, which can be reached at (212) 682-0681. Once again, we wish to thank THE RAINBOW readers for their generous contributions, uploads and support.

Steve Schechter
Sysop

Editor:

I would like to announce the new number for our Maxi CoCo BBS 5.0 Bulletin Board System: (216) 793-7353. We operate at 300 Baud, 24 hours a day, seven days a week. Our Sysop is Curt Nickel.

William Wills
Youngstown, OH

Editor:

I would like to inform your readers that I run the CoCo Beach BBS in Kent. It is up 24 hours a day and includes downloads, uploads, great text files and online pictures. The number is (206) 432-2512.

Jeff Gill, Jr.
Kent, WA

Editor:

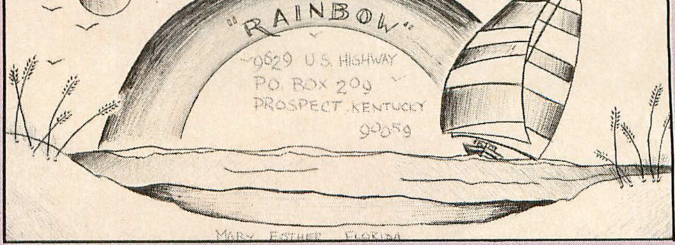
Halifax Dartmouth Colour Computer Users Group (HDCCUG) BBS operates Monday through Friday, 9:30 p.m. to 9 a.m.; Saturday, 5:30 p.m. through Monday, 9 a.m.; (902) 434-5278; Sysop is Peter Allen.

Please do not call outside of the advertised hours. This is a business line for Sector Software.

A. Knight
Dartmouth, Nova Scotia

THE RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

ARTS AND LETTERS



Envelope Of The Month

John Kniatkowski
Mary Esther, FL

IT'S ONLY 4½ LBS.
AND RARING TO GO!

The Tandy 200 is the one portable for all.

Meet the New Generation of Portable Computing

Our celebrated Model 100 set a new standard in portable computing. Now we've done it again! Introducing the Tandy 200, another true breakthrough, featuring advanced features *you* requested. You get more built-in software, a bigger screen and a larger memory. All this in a system that measures just $2\frac{1}{4} \times 11\frac{3}{4} \times 8\frac{1}{2}$", and goes wherever you go because it's completely battery powered.

Six Built-In Programs Including Multiplan™

For complex spreadsheet analysis and calculations, we put popular Multiplan software into the Tandy 200's permanent memory. It's easy to do sales forecasts, profit and loss projections, budgeting, pricing, engineering calculations and more.

Comes with Five More Powerful Programs

An improved version of the Model 100's easy-to-use word processing program makes the Tandy 200 especially useful for journalists, salespeople, students and anyone who needs to write letter-perfect memos, reports and correspondence in a hurry. Edit, delete and move blocks of text with the touch of a convenient function key.

Four other "instant-on" programs let you use the Tandy 200 as your personal appointment calendar, address and phone directory and telephone auto-dialer/directory (the Tandy 200 generates tone dialing pulses, so you can use it with long-distance services). A much more powerful built-in program for communications makes it easy to access other computers by phone, as well as national information networks. Resident BASIC language lets you write your own programs, too.

Why 40 Columns Are "Bigger" than 80

Take a look at the 80-column screens on other portables, and you'll see why we chose a 16 × 40-character format. Characters on 80-column displays are tiny and difficult to read. Tandy 200's flip-up liquid crystal display has 240 × 128 resolution for big, clear graphics and easy-to-read characters. Tandy 200 is the perfect take-along tool for word processing and spreadsheets—without eyestrain.

We also increased the standard memory size to 24,000 characters, expandable to 72K.

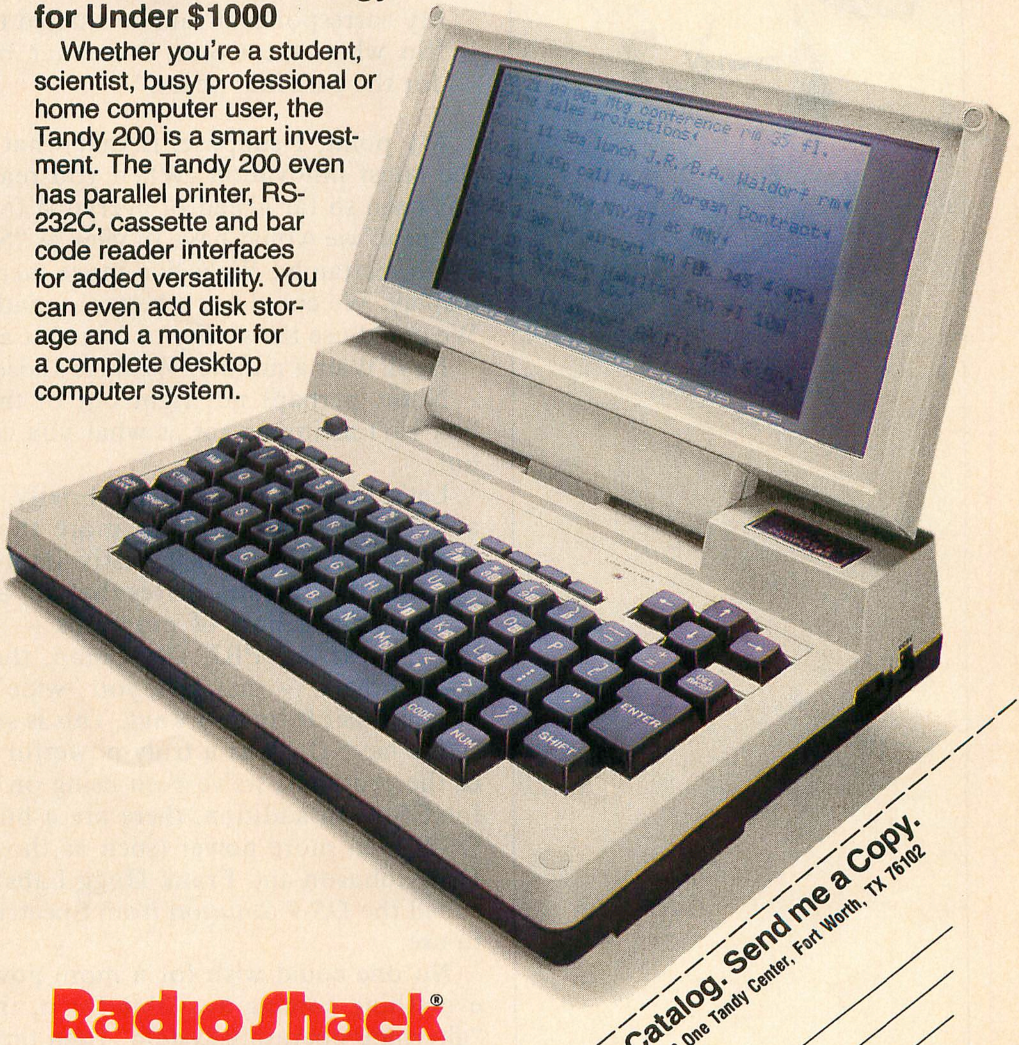
The Best in Technology for Under $1000

Whether you're a student, scientist, busy professional or home computer user, the Tandy 200 is a smart investment. The Tandy 200 even has parallel printer, RS-232C, cassette and bar code reader interfaces for added versatility. You can even add disk storage and a monitor for a complete desktop computer system.

Adopt One Today!

Step up to the powerful software and impressive capabilities of the Tandy 200 portable computer for just $999 (26-3860). Best of all, the Advanced Technology Tandy 200 represents the state of the art in performance, quality and price breakthrough (because we've introduced the latest technology for over 60 years). Stop by your local Radio Shack Computer Center, or participating Radio Shack store or dealer and "size it up" today!

Prices apply at Radio Shack Computer Centers and at participating Radio Shack stores and dealers. Multiplan/TM Microsoft Corp.



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PRINT #-2,

Whenever members of the CoCo Community gather together, one of the first subjects these days seems to turn to the "new" Color Computer. With a mixture of expectation, speculation and lots of other things, people all have different ideas about what might be coming next from Tandy.

I was reminded about this the other day when I received a letter from a reader. He mentioned that he had a friend who was "into" Commodore computers and, having just bought the latest one, came running over to show off the new manual.

"Look at this," crowed the Commodorian (a new word, perhaps?). "The 'new' Commodore has a `LINE` command, a `CIRCLE` command and a bunch of other stuff, too!"

My correspondent said he studied the manual for a minute and replied: "So what, the Color Computer has had all this — and a lot more — for the past four years."

My point, I suppose, is that what we take for granted many view as the latest innovation. When you really look at it, the Color Computer has been so far ahead of everyone for so long that anything others have as "new" we would have to view as "So what?"

Oh, certainly. We'd like more memory. We could use a better screen display. We could use a better — and more friendly — operating system. We could use the ability to mix text and graphics on the same screen.

Hey! Wait a minute. We *have* those things!

Nope, perhaps not right out of the box. But what comes out of the box isn't as important as what you can do with the things that do come out.

Let's look at these things briefly. You can upgrade CoCo to 128K, and I keep hearing about more than that. I also keep hearing about hard drives, too, which vastly improve the storage "memory"; not to mention the fine disk drives that are available.

There are a host of programs — from *Telewriter* (the first) through the *Elite* series, PBJ, Cer-Comp, the *Pro-Color* Series, *DynaCalc* and many others — that give you "wide" screen displays, in an application or any other form you want. This is something of a "standard," really.

We have OS-9 as a truly powerful operating system. And, now, many of the programs we've been using on a "regular" CoCo are being written for OS-9. In addition, there are a bunch of new programs out that give OS-9 even more power (such as those from Computerware, Microtech, D.P. Johnson and Frank Hogg Labs). And, too, there is a new program called the *OS-9 Solution* from Spectrum Projects which makes OS-9 easy to use.

No one could wish for a more powerful system than OS-9. And with everything coming available for it, there are more ways to go with this "alternate operating system" than there are for some "primary" systems, period.

It is almost silly to have to mention all the wonders you can do with the CoCo screen. We have *CoCo Max, ViziDraw, Graphicom, Bjork Blocks,* the Nexus system and a host of others. We also have printer utilities galore, enough games to satisfy even the most ambidextrous Earthling, some super speech programs and some really innovative things

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

RAINBOW
CERTIFICATION
SEAL

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
> — The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

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Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add $2 for shipping. Californians add 6% state tax.)

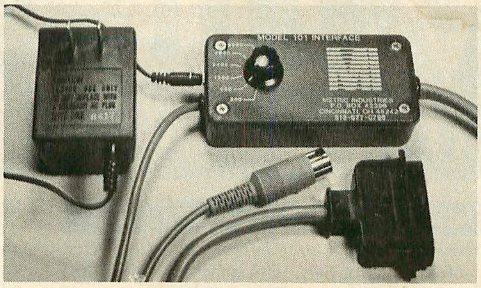
Now available at
Radio Shack stores
via express order

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.

Metric Industries

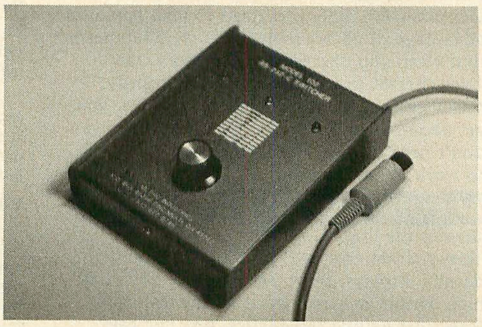
MODEL 101 INTERFACE ~~54.95~~ 49.50

The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). It comes with a "UL" listed power supply that can be unplugged from the interface if your printer supplies power (Most do). The 101 is only 4" x 2" x 1" and comes with all cables and connectors for your computer and printer.



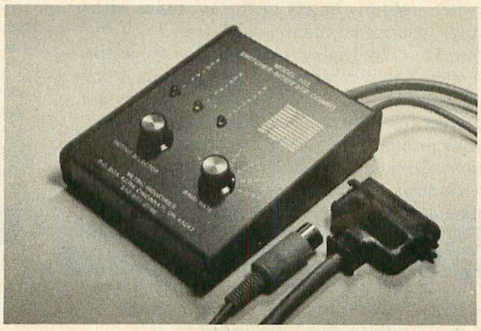
MODEL 102 SWITCHER 35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.



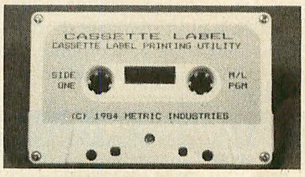
MODEL 103 COMBO ~~85.95~~ 73.50

With the turn of a knob the model 103 switches your computer's RS232C serial port to any one of 3 outputs — 2 serial and 1 parallel. The serial ports may be used for modems, serial printers or even another computer. The parallel port can be used with any Centronics compatible printer. The 103 has the best features from the 101 and 102: color coded position indicator lights, 6 switch selectable baud rates, heavy anodized aluminum cabinet, "UL" listed power supply and many more.



The Model 101, 102 and 103 will work with any level COCO basic, any memory size 4K-64K and are covered by a 180 day warranty.

The Model 101 and 103 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Gorillia, C.Itoth, Okidata and many others. They support basic print commands, word processors and graphic commands.



CASSETTE LABEL PROGRAM 6.95

This fancy printing utility prints 5 lines of information on pinfeed cassette labels. "Cassette Label" is menu driven and is very easy to use. It uses the special features of your printer for standard, extended or condensed characters. Each line of text is automatically centered. Before the label is printed, it is shown on your CRT — enabling you to make changes if you like — then print 1, 2 or 100 labels. The program comes on tape and it is supplied with 24 labels to get you started. 16K ECB required.

OTHER ITEMS

High quality 5-screw shell C-10 cassette tapes **$7.50/dozen**
Hard plastic storage boxes for cassette tapes **$2.50/dozen**
Pin feed cassette labels **$3.00/100**

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that fall into almost no category, such as Speech Systems' EARS, Green Mountain Micro's Machine Language Learning Lab, a whole host of small business software and so much more I cannot even keep track of it all.

Honestly, these things just roll off my fingertips and into my word processor! For each I have mentioned, there are scads of others. No, I am not trying to give a commercial for these firms.

What I am doing, though, is wondering aloud whether we even *need* a "new" Color Computer. Tandy keeps lowering the price, and the support — from both third party and Tandy — keeps getting better. In short, we have a super computer. Maybe we have reached close to an ultimate.

Not an ultimate in what people can make CoCo do, because I believe we will continue to keep expanding both the quality and quantity of what is available for the Color Computer. But I have to remember I paid $399 for my first CoCo and got 4K of memory and just regular BASIC. Now you get 32K, Extended BASIC and a better keyboard for just $169.95.

> ***"Maybe the CoCo as we know it . . . is pretty much perfect."***

I keep thinking of Thor. He invented the wheel. We haven't been able to improve on it much in quite some time. Maybe the CoCo as we know it — as a machine — is pretty much perfect.

Maybe in Thor's time there were people who invented other things to get around on. Bags which squeezed out mud so that things could slither along? But the wheel was the best.

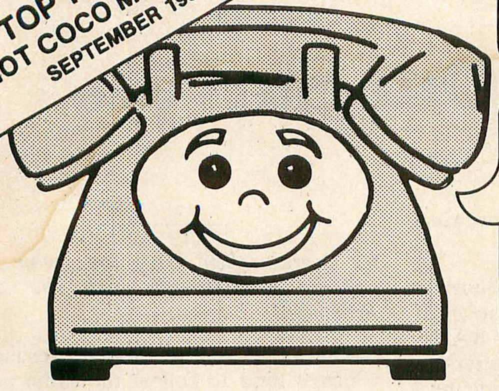
I like to think CoCo is the wheel of home computers. We'll have people who use it to do a variety of things — turn with water, provide a "base" for vehicles, use it to tell time with gears and the like. Constantly, people will find better, more efficient and a greater variety of uses for CoCo.

But can they make CoCo itself better? Or is it, much like the wheel, so good that it is well near perfect at the price?

Sometimes I truly wonder.

— Lonnie Falk

TOP RATINGS
HOT COCO MAGAZINE
SEPTEMBER 1984



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BUILDING AUGUST'S RAINBOW

Analyzing Our Surveys

- *What's this, a new format for your column? What gives?*

Well, as they say, imitation is the sincerest form of flattery — or, at least, the most obvious. So, when I note from our RAINBOWfest survey responses that "Letters to Rainbow," "Reviewing Reviews," "Pipeline," "Downloads" and "Earth to Ed" are among our top-rated departments, I recognize a good device when I see one: concise, topical treatment of reader concerns. Besides, I get mail, too, and I have no shame. Shoot the Answer Man another question.

- *OK, what else did you glean from the survey?*

That **Joseph Kolar, Dick White, Dale Puckett** and **Tony DiStefano** needn't consider changing anything; our survey respondents rate them tops. In fact, **all of our departments received gratifyingly good marks.** Oh, nobody escaped getting a share of the "fair" and "poor" marks, but, overall, all of our regulars were rated "excellent" or "good" some 70 to 85% of the time. For obvious reasons, we'll keep the total rankings confidential, but, just for the record, "Scoreboard" and "Scoreboard Pointers" were ranked at the very bottom.

- *Aha! Does that mean they get the ax?*

Maybe. Maybe not. Certainly, a low rating means we're going to take a strong look at a given department, but before we give up the ballgame, perhaps we'll "punt" and regroup. **Surveys have so many variables** and are only one part of our continuing evaluation process.

- *OK, OK. We all know statistics must be kept in perspective. Now tell us what we told you. What else did you learn?*

Our RAINBOWfest-Irvine respondents say they bought, on the average, **four products** in the past year as a result of RAINBOW ads. Ranking at the top of **software most wanted are utilities and word processing,** followed by business and games. As to hardware, **acquiring a monitor was the chief interest,** followed closely by more memory, disk drives, modems and speech/sound synthesizers. While 98% of Irvine respondents rated THE RAINBOW as excellent or good (76% excellent!), they would like to see more utilities, hardware and machine language.

- *Overall, then, I see the Irvine survey corresponds closely with the one at Princeton.*

That's true, and preliminary results from Chicago tend to follow the same pattern. A significant 45% or our respondents indicated they are hesitant about buying from a new advertiser. Concomitantly, they **prefer to see a new product advertised three times, or more,** before being inclined to purchase it. In fact, a whopping 89% of respondents rely on RAINBOW reviews. Some 28% always wait and another 61% at least sometimes wait until they've seen RAINBOW's product review before making a purchase. And, 88% of those surveyed rate our reviewers as qualified (59%) or well-qualified (29%).

- *What else did we tell you?*

Well, 92% at least sometimes will type in a program listing, but only 12% do so frequently. A full 93% of those surveyed have had occasion to use our advertiser index. Some 78% say **color ads get their attention more than black and white ads.**

- *What's the feeling about issue themes?*

In general, respondents seem well pleased. Only a mere 3% said they seldom or never like them. The **most popular are the Anniversary, Utilities, Games** and **Beginners issues** — in that order. The Music and Business themes were rated lowest with Printers and Education doing only slightly better. Is there a theme you'd like to see?

- *I'll think about it. In the meantime, isn't it time for your closing theme?*

How kind of you to remember. Yes, that brings us to the $31 question. You see, the survey form we value the highest is THE RAINBOW subscription form — yes, we certainly do read and heed the comments RAINBOW and RAINBOW ON TAPE subscribers make — because that means you're a regular reader and, as the first question in this column underlines, **our readers are rated tops as writers, too.**

— **Jim Reed**

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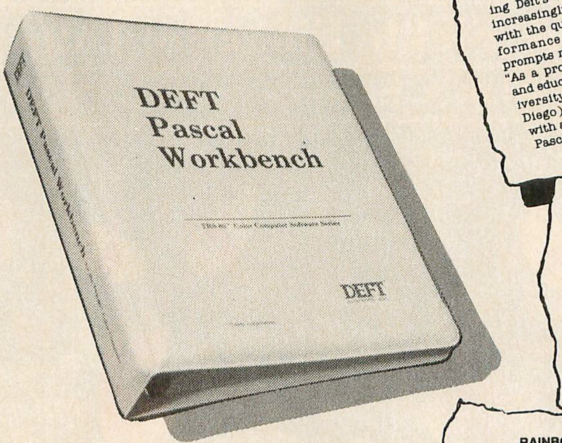

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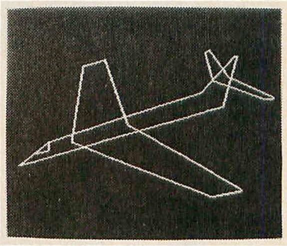

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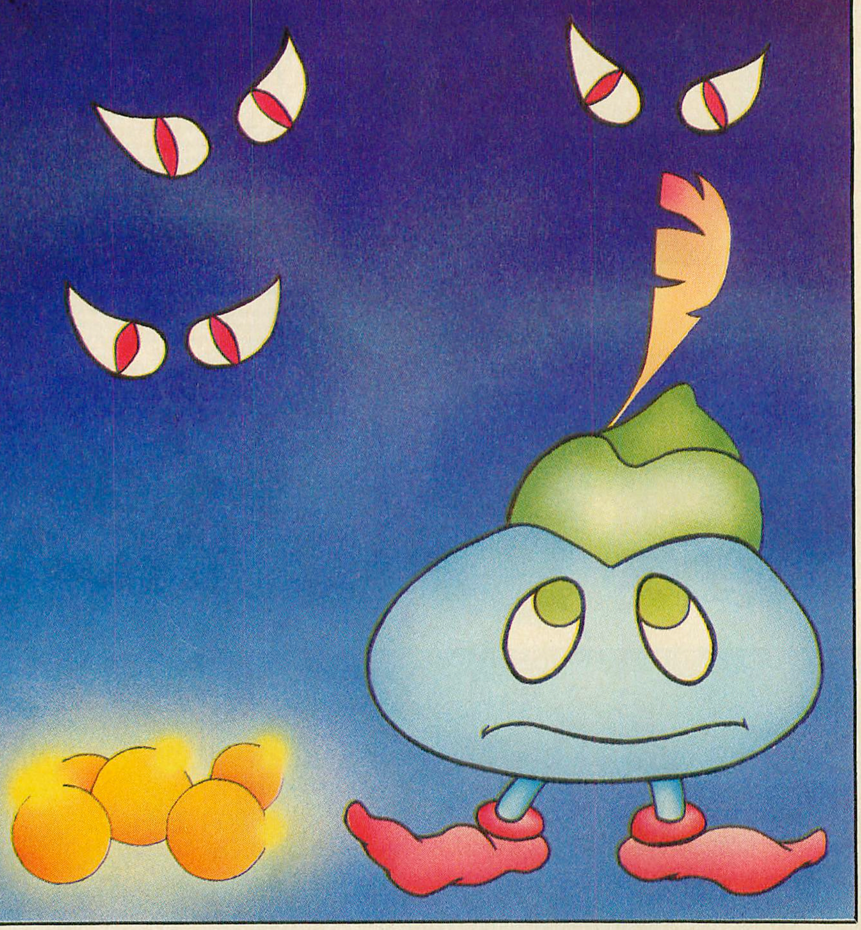
Brotan the Blue

Takes On The Fickle Finger of Fate

By Alan A. Saporta



Just a few minutes ago, you were the high apprentice of Zygon, a powerful wizard who dwells in the hills of a countryside. It was a routine magic-creating day until the wizard asked you to hand him the maroon potion, but accidentally, you gave him the azure potion. The mixing of his new potion with the wrong ingredient (he hadn't noticed your foolish mistake) resulted in an explosion and destruction of part of his laboratory.

Even though he was close to the blast, he did survive and, in his rage, turned you into a Brotan. Brotans are short, blue creatures (no, not Smurfs! Brotans are shorter) with two green eyes and one mouth. Their only purpose in life is to eat yellow energy dots and (something that goes without saying) avoid red Gremlins who eat anything, including yellow energy dots, themselves and blue Brotans.

If you attain an energy score of 15,000, Zygon will return you to your normal state. But, until then, he has placed you in a strange box where two things are constantly produced: yellow energy dots and red Gremlins.

How to Play

This is a game for those with 32K Extended Color BASIC. You use three of the arrow keys to move the Brotan to the right, left and down. Once you go down an opening, you can't go back up. Because PEEKs are used to poll the keyboard, there is no need to continuously hit the keys; just hold down the arrow key of your choice.

After the title page is displayed, press any key (except BREAK) and the screen ("strange box") will be drawn. The strange box has six levels. At the beginning, the first two levels have three openings, the next three have two openings and the exit level has one.

The Brotan begins at the topmost, inner level at the left. To cross an opening just continue in one direction and a bridge will be formed. If you want to descend an opening, place yourself on top of it (lean a bit to the left) and press the down-arrow key. The bridge will be broken (if there is one) and a blue "slide" will form on which the Brotan will descend.

The energy dots are the yellow plus signs that line the top of each level. They are placed at a random distance from one another and can be worth zero, four, eight or 12 points. That, too, is random. When you score, the screen flashes and sounds, and four points are added to your energy score. If an energy dot is worth eight points the screen will flash twice and eight points are added, etc. Some dots are what I call "duds" — they are worthless. If you encounter one, you will simply consume it with no ill effects.

In the middle of the box is a giant red energy dot. If eaten, the screen flashes and 50 points are added. There is one per screen.

When you advance a skill rank, one of the openings on one of the levels will be blocked, preventing your escape to a lower level and increasing your chances of losing one "man" (you have eight). The skill ranks are as follows: Completing the first screen places you on the first rank, then every 250th point you will advance to the next rank (meaning more openings will be blocked if and when you reach the next screen). You can jump two or three skill ranks in one screen (just count how many

---

(Alan Saporta is a sophomore and a self-taught computerist. He has worked with many different computers, but his favorite is the Color Computer.)

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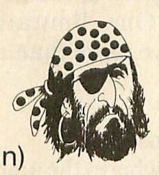

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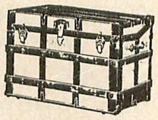

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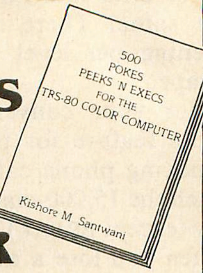

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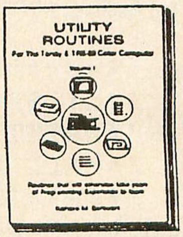

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openings have been blocked when the next screen is drawn). When you reach the seventh skill rank everything stays the same. There will only be one opening per level through which to escape.

For your convenience, there is a pause feature for those who get that annoying phone call right before they reach the 15,000 mark. By pressing any key (except BREAK) all action will stop. When you lose a man your score and the amount of men you have left are updated.

If your computer can't take the "speed-up" POKE 65495,0, then delete it from lines 10 and 2011. Also, if you reach 15,000 you are given the option to continue (just in case you want to know how high a score you can get). When you reach 2,000 points you get an extra man and at 5,000 you get two more. You also get points when you descend openings. One limitation, though: You can't have more than nine men at once.

About Those Gremlins

They pop out everywhere (the amount and where they pop out is randomly determined). If one ever blocks your only means of reaching the next level, you can kill him by hitting him, but it will cost you at least one man; many will get two and some can never be killed, making death inevitable. Most *can* be killed, but that's a chance you'll have to take.

Hints

Here are a few hints that will help: 1) The leftmost row of energy dots is duds; 2) Even though the red Gremlins appear as if they are nomads, after some experience you might catch a "pattern" they may follow; and 3) If two red Gremlins are on both sides of you and both block another opening, always kill the one on your left (the Brotan's right).

This game is based more on luck and risk than skill. Will you eat more energy dots, or will you escape down an opening because with one man left you're afraid a red Gremlin will appear and block your path to victory? *Brotan the Blue* is a great escape from the monotonous life of a wizard's apprentice.

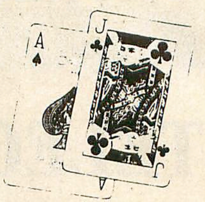
32	226
54	239
210	62
506	14
1008	59
2004	150
END	104

The listing: BROTAN

```
0 '*******BROTAN********
2 '(C)1984 BY A.A.M.S.&ASAP CO
4 '*WRITTEN BY ALAN A SAPORTA*
6 '**ALL RIGHTS RESERVED******
8 '*****JULY 1984**************
10 PCLEAR8:CLEAR1000:X=32:Y=25:G
Y=8:SC=0:DIM BL(24,16):FR=0:X=RN
D(-TIMER)
12 POKE 65495,0:GOSUB 2000
14 GOSUB400:GOSUB1000:GOSUB1050
16 CL=RND(50):FORCD=32TO224 STEP
 CL:FOR RY=25TO125 STEP 20:CIRCL
E(CD,RY),3,2:NEXT RY,CD:CD=218:X
=32:Y=25:MX=CD:IF RK=5 THEN GOTO
1012
17 CIRCLE(134,72),5,4:PAINT(135,
72),4,4
18 D=PEEK(342):L=PEEK(343):R=PEE
K(344):S=X:F=Y:RK=0:CD=218
20 IF D=247 AND Y=>25 AND Y<108
THEN GOTO100 ELSE IF Y>108 AND D
=247 THEN GOTO500
22 IF L=247 THEN X=X-2:GOTO28
24 IF R=247 THEN X=X+2:GOTO28
26 GOTO18
28 IF X<32 THEN X=32
30 IF X>218 THEN X=218
32 PUT(S,F)-(S+8,Y+11),SP:IFSC>2
000THENGY=GY+1:IFSC>5000ANDFR=1T
HENGY=GY+2:FR=2:IFSC>10000ANDFR=
2THENGY=GY+3:FR=3
34 PUT(CD,Y)-(CD+8,Y+11),SP:IFSC
<15000 THEN 36 ELSE IFRP=1 THENG
OTO35
35 CLS:PRINT"YOU HAVE BEEN LET O
UT!":PRINT:PRINT"YOU HAVE WON!":
PRINT:PRINT"BUT WOULD YOU LIKE T
O CONTINUE TO SEE HOW HIGH A SCO
RE YOU CAN GET";:INPUTGP$:IFLEFT
$(GP$,1)<>"Y"THEN END ELSE PMODE
3,1:SCREEN1,0:RP=10
36 PUT(X,Y)-(X+8,Y+11),GU
37 IF Y=65 AND PPOINT(X-1,Y+10)=
4 OR PPOINT(X+10,Y+9)=4 AND X>11
9 AND X<139 THEN SC=SC+50:PMODE4
,1:SCREEN1,1:PMODE3,1:SOUND150,2
:SOUND155,2:SOUND162,2:SCREEN1,0
38 A=PPOINT(X-1,Y):B=PPOINT(X+12
,Y):IFX=32THEN18ELSE IF A=4 OR B
=4 THEN GOTO 200 ELSE IF A=2 OR
B=2 AND X>33 THEN SC=SC+4:PMODE3
,1:SCREEN1,1:PLAY"T200O3V31GABBG
CGDAB":SCREEN1,0
40 RR=RND(101):IF RR>50 AND RR<5
5 THEN GOTO 50 ELSE GOTO 18
42 GOTO18
50 MX=CV:CD=RND(188)+32:CR=CD-MX
:IFCR>30 THENCD=MX+30 ELSEIFCR<0
THEN GOTO56
52 CD=MX+CR:PUT(CD,Y)-(CD+8,Y+11
),SP:PUT(CD,Y)-(CD+8,Y+11),MO:GO
TO38
```

```
54 GOTO18
56 RF=MX-CR:FOR CV=MX TO RF:PUT(
CV,Y)-(CV+12,Y+11),SP:PUT(CV,Y)-
(CV+12,Y+11),MO:RK=8:GOTO38:NEXT
 CV
58 GOTO18
100 Y(1)=Y:Y(2)=Y+20:IFPPOINT(X+
4,Y+13)<>1THENPOKE342,255:GOTO18
102 FOR YR=Y(1) TO Y(2):PUT(X,YR
)-(X+12,YR+11),GU:NEXT YR:SC=SC+
5:POKE342,255:Y=YR-1:GOTO18
200 RK=1:GY=GY-1:IFGY=0THENGOTO2
08
201 IF GY>10 THEN GY=9
202 COLOR1,1:LINE(150,160)-(220,
190),PSET,BF:DRAW"C3BM152,165D8U
8F8E8D8BR4R6L6U8R6L6D4R3L3D4R6BR
6U8F8U8BR4BD7BR6C2"+N$(GY):IF RK
=3THENGOTO1012
204 SOUND3,4:SOUND2,5:SOUND1,8:G
OSUB300
206 GOTO 18
208 PMODE4,1:SCREEN1,1:PMODE3,1:
PLAY"L801T2EFDCBAG":FORT=1TO900:
NEXTT:PCLS
210 CLS0:PRINT@0,"YOUR SCORE:";S
C
212 PRINT@128,"PLAY AGAIN (Y/N)"
;:INPUTA$:SCREEN0,1:IFLEFT$(A$,1
)="Y"THEN10ELSE CLEAR:END
214 END
300 COLOR1,1:LINE(30,160)-(130,1
80),PSET,BF:SC$=STR$(SC):YS=84:F
ORR=2TOLEN(SC$):S$=N$(VAL(MID$(S
C$,R,1))):DRAW"BM"+STR$(YS)+",17
2C4"+S$:YS=YS+10:NEXTR:DRAW"BM30
,172C4R5U3L5U2R5BR4BD5U5NR5D5R5B
R4NR5U5R5D5BR4U5R6D2L6RF3BR6NR5U
3NR3U2R5"
302 RETURN
400 FORZ=0TO9:READN$(Z):NEXTZ:RE
TURN
402 DATA"U6R4D6NL4BR","BR2BU3E3D
6BR","NR4E5HL3G2BR","R4U3NL2U3L4
BR","BU2U4D4R6L2U4D6BR3","BU6R6L
6D2R4FD2GL4R3BR3","U6D6R5U3L5R5D
3BR","E6L6R6BD6BR","U6R4D3NL4D3N
L4BR","BR4U3L4U3R4D6BR"
500 IFX>48THENGOTO18ELSE IFX=>32
 AND X<48THENFORY=125TO152:PUT(X
,Y)-(X+12,Y+12),GU:PUT(X,Y)-(X+1
2,Y+11),SP:NEXTY:RL=2
502 IF RL<>2THENPOKE342,255:GOTO
18ELSEGOSUB1000:GET(136,48)-(160
,64),BL:SC=SC+15
504 IFPPOINT(72,36)=1THENPUT(60,
28)-(84,44),BL:IFSC>250THENPUT(3
2,48)-(56,64),BL:IFSC>500THENPUT
(200,88)-(224,104),BL:IFSC>750TH
```

NEW!



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By Steve Hartford

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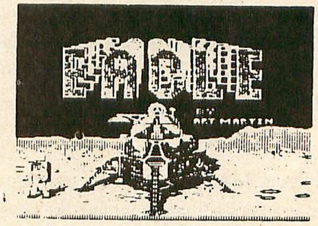

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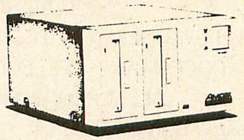

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See reviews in:
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```
ENPUT(164,28)-(188,44),BL:IFSC>1
000THENPUT(76,68)-(100,84),BL
506 IFSC>1250THENPUT(164,108)-(1
88,124),BL:IFSC>1500THENPUT(164,
28)-(188,44),BL
508 X=32:Y=25:POKE342,255:GOTO16
510 GOTO18
1000 PMODE3,1:PCLS2:COLOR4,2:LIN
E(8,8)-(248,152),PSET,B
1002 DRAW"C4BM8,8F8R20H8L20F8D13
6NH8R16U16NL8H8ND8U4R80U8NH8L80U
8NR72U4R24U8NH8L24U8NR16U4R60U8N
H8L60U8NR52U4R16U8NH8L16U8NR8U4R
44U8NH8L44U8NR36U4R12U8"
1004 DRAW"BM44,8D8F8U8H8R196C2R8
ND7L8C4F8L196D8R180ND4R8D12H8L52
D8F8U8NH8R52BD8L8ND4NL44R8D12H8L
20D8F8U8NH8NR20D8R12ND4R8D12H8L4
8D8F8U8NH8R48BD8L48R40ND4R8D12H8
L16D8F8U8NH8R16BD8L16R8ND4R8D12"
1006 DRAW"H8L52D8F8U8NH8R52BD8L5
2R46ND4R8D12NH8L192H8NR192D16F8U
16D16BRC2L16BM30,8R13BM8,145D7R7
BM76,28C4D8F8U8H8R52F8BM144,28D8
F8U8H8R20F8BM112,108D8F8U8H8R52F
8"
1008 LINE(84,36)-(136,44),PSET,B
:LINE(152,36)-(172,44),PSET,B:LI
NE(56,56)-(116,64),PSET,B:LINE(1
32,56)-(204,64),PSET,B:LINE(100,
76)-(178,84),PSET,B:LINE(64,96)-
(208,104),PSET,B:LINE(120,116)-(
172,124),PSET,B
1010 DRAW"BM48,48D8F8U8H8R60F8BM
124,48D8F8U8H8R72F8BM92,68D8F8U8
H8R76F8BM56,88D8F8U8H8R144F8":FO
R YT=40TO120 STEP20:PAINT(134,YT
),3,4:NEXT YT:PAINT(160,40),3,4:
PAINT(100,20),3,4:PAINT(20,36),3
,4:PAINT(92,60),3,4:PAINT(40,16)
,1,4:RK=3:GOTO202
1011 RK=5:GOTO16
1012 RETURN
1050 DIM GU(8,11),MO(8,11),SP(8,
11)
1052 PCOPY1TO5
1054 A$="BR2R5L5GD4FR5EU4HL3D4L2
R4DGLD3FR2L2HGL":B$="C4R8L3D3LU3
D3L3D4R8U4L5D3L2R4L2D3G2LRE2F2R2
"
1056 DRAW"BM40,25C3;XA$;"
1058 GET(40,25)-(48,36),GU:PCOPY
5TO1:GET(40,25)-(48,36),SP
1060 DRAW"BM40,25;XB$;":GET(40,2
5)-(48,36),MO:PCOPY5TO1:RETURN
2000 PMODE4,2:SCREEN1,1:PMODE3,2
:PCLS4
2002 A$="ND24R24D24NR8NU24L24D32
R32NU32BR12U56R24D24L24F32BR12U5
6R24D56NL24BR10BU56NR24R12D56BR1
2U12R4U12R4U12R4U12R4U8D8R4D12R4
D12NL20R4D12R4D12BR12U56D8R7D12R
7D12R7D12R7D12U56"
2004 DRAW"BM12,20C1;XA$;BM20,24C
3;XA$;"
2006 DRAW"BD100BL200C3D28R12U12N
L12D12BR8BU4NU16R12NU16D12NL12U1
2BR12BU4R8C2BR12BD8U12NR16U8R16D
20BR6NU20R12BR6U12NR16U8R16D20BR
6U20F20NU20BR20U12NR16U8R16D20BR
4RULD"
2008 DRAW"S5;BD10BL90C3L20D10R20
D10NL20;S4;BR6U12R16D4NL16D8BR6U
12R16D4NL16BD8BR6U12R16D12NL16BR
6U12R16D4L16R8F8BR13U12L7R16BD12
BR6U12R16D4NL16D8"
2010 FORR=1TO1000:NEXTR:PAINT(18
0,37),2,3:PAINT(50,64),2,3:PAINT
(40,25),2,3:PAINT(120,35),2,3:PA
INT(75,35),2,3:PAINT(0,0),2,3:PA
INT(40,148),2,3
2011 POKE65494,0:PLAY"T8V3102BAG
AB;P1;B;P1;BBBBB;P1;A;P1;A;P1;AA
AAA;P1;B;P1;B;P1;BBBBB;P1;BAGA;B
;P1;B;P1;BBBBB;P1;A;P1;A;P1;B;P1
;A;P1;GGGGGGG":POKE65495,0
2012 EXEC44539:PCLS:PMODE3,1:SCR
EEN1,0:PCLS2:RETURN
```

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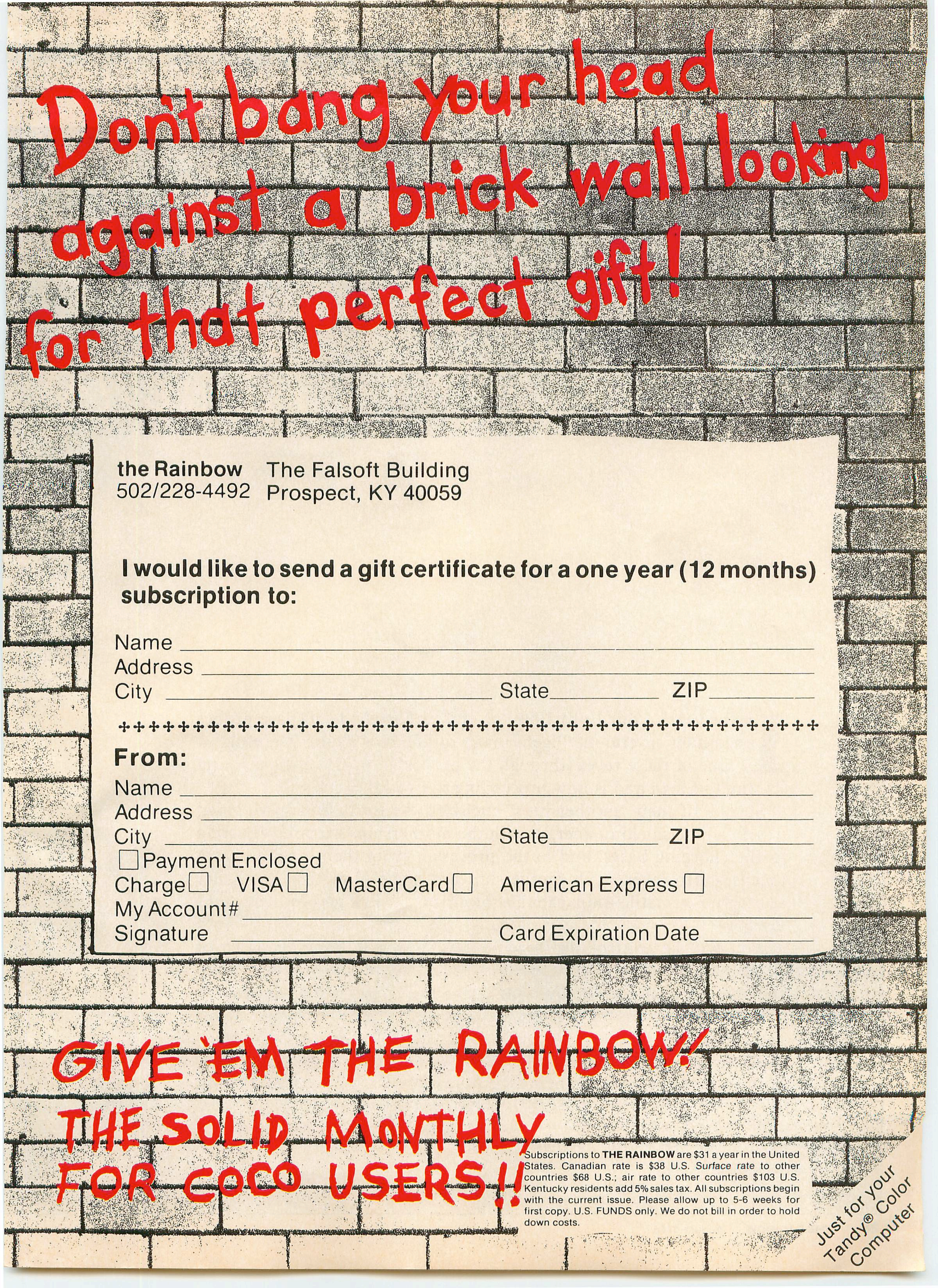
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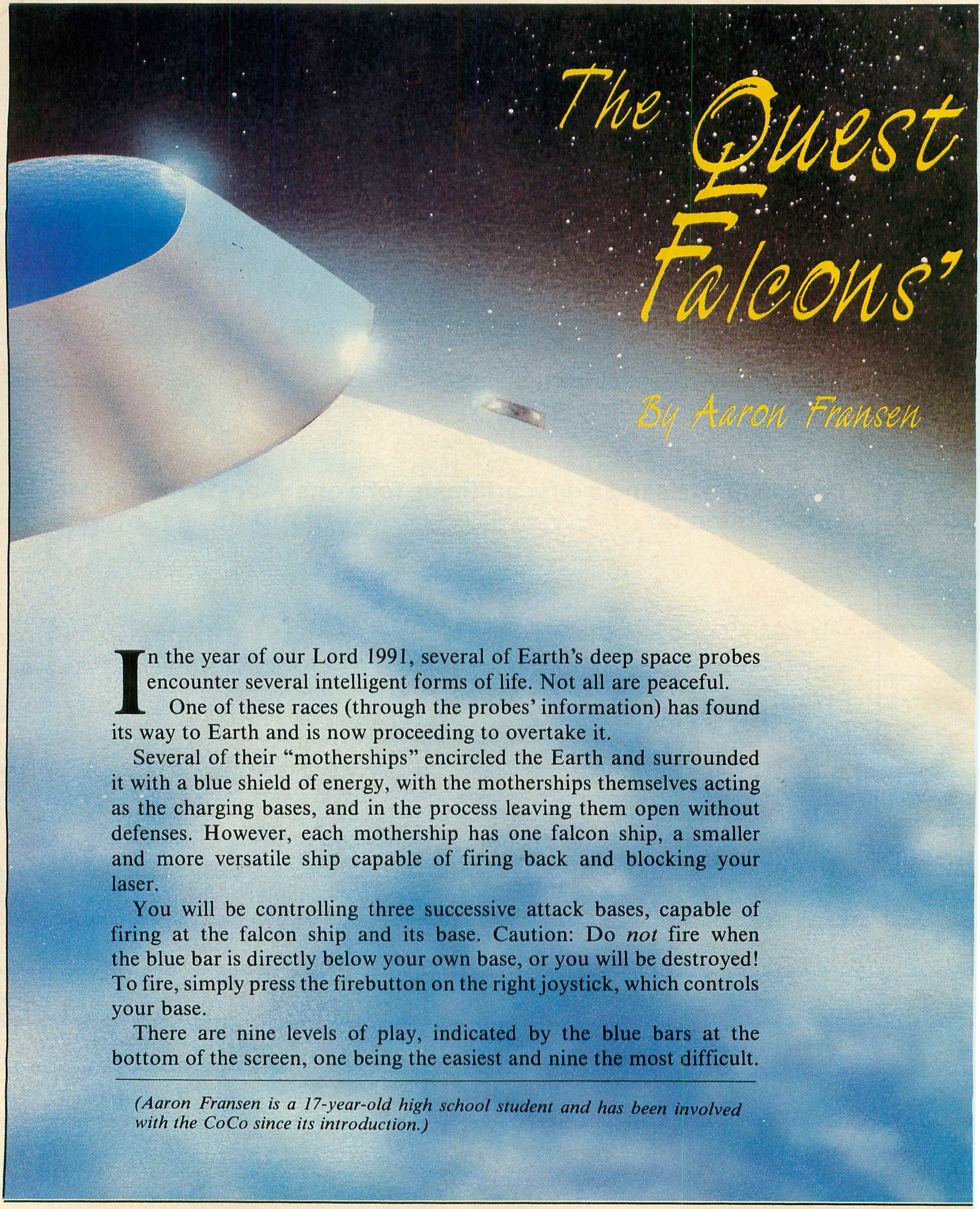

The Quest Falcons'

By Aaron Fransen

In the year of our Lord 1991, several of Earth's deep space probes encounter several intelligent forms of life. Not all are peaceful.

One of these races (through the probes' information) has found its way to Earth and is now proceeding to overtake it.

Several of their "motherships" encircled the Earth and surrounded it with a blue shield of energy, with the motherships themselves acting as the charging bases, and in the process leaving them open without defenses. However, each mothership has one falcon ship, a smaller and more versatile ship capable of firing back and blocking your laser.

You will be controlling three successive attack bases, capable of firing at the falcon ship and its base. Caution: Do *not* fire when the blue bar is directly below your own base, or you will be destroyed! To fire, simply press the firebutton on the right joystick, which controls your base.

There are nine levels of play, indicated by the blue bars at the bottom of the screen, one being the easiest and nine the most difficult.

(Aaron Fransen is a 17-year-old high school student and has been involved with the CoCo since its introduction.)

32K
ECB

for the Lair

You will receive three bases, indicated by the red bars at the bottom of the screen (emanating from the right). Your score is indicated by a red line at the bottom (emanating from the left).

What you must do is shoot through the defense of the falcon ship's base (the Falcon's Lair) so you may then destroy the Lair's power cell. Once it is destroyed the entire ship falls to the ground, explodes and you are transported to another Lair's area.

The more of the shield you destroy before destroying the power cell, the higher your score will be at the end of the round. This is not as easy as it may seem. As each level progresses, the shield starts to rebuild itself at speeds according to the level of play.

The listing is rather long, but hopefully you'll find the game to be worth it. If you would like a line-by-line reference and variable reference table for this game, please send a SASE and $1 to me at this address: Box 817, Revelstoke, British Columbia, Canada V0E 2S0.

Please remember I live in Canada, so use sufficient postage. If you simply have a question, complaint (or compliment?) or other comment, just send a SASE to the same address.

Instructions:

1) Load game.
2) RUN it (you may have to run it twice because of a bug in BASIC).
3) Press Reset (and RUN) until screen is red.
4) After the title page comes up and the introduction sounds are played, press fire.
5) Adjust the right joystick to select difficulty, then press the firebutton.
6) After a few seconds the game will begin. The object is to destroy the blue power cell at the center of the Falcon's Lair (at the top of the screen), while at the same time either destroying or avoiding the small falcon ship which hovers just below the Falcon's Lair. *Do not* fire when the blue bar (the one that moves about) is directly below you, or you will be destroyed.
7) After you have lost all three bases, the game ends, showing you your final score and asking if you would like to try again. Your selection is made by adjusting the right joystick until the white box is around the appropriate answer; then press fire.

9	11
19	75
31	183
45	25
52	64
63	152
69	85
82	149
END	92

The listing: FLCNLAIR

```
1 PCLEAR7:PMODE4,1:SCREEN1,1:PMO
DE3:PCLS3
2 I$=INKEY$:IFI$=""THEN2
3 CLS:DIM X,Y,EX,EY,PX,T,R,LEV,M
EN,A(10),E(656),E1(50),E2(50),Y(
16),P(31),D$(61),D(50),N$(9):ER$
="R8DL8DR8DL8DR8DL8BU5"
4 POKE187,0:FORT=0TO16:READ Y(T)
:NEXT:FORT=0TO26:READ D$(T):NEXT
:FORT=0TO9:READ N$(T):NEXT
5 PMODE4,4:PCLS:PMODE4,1:PCLS1:S
CREEN1,1:I$="THE":DRAW"C0S8BM100
,20":GOSUB79:I$="FALCONS":DRAW"S
16BM14,60":GOSUB81:I$="LAIR":DRA
W"BM60,90":GOSUB81
6 I$="BY@AARON@MARTIN@FRANSEN":D
RAW"S4BM30,140":GOSUB79:FORT=0TO
7:GET(25,145-T)-(210,145-T),E,G:
PUT(25+T,145-T)-(210+T,145-T),E,
PSET:NEXT
7 PMODE3:COLOR3:LINE(0,0)-(255,1
91),PSET,B:COLOR2:LINE(4,4)-(251
,187),PSET,B:PMODE4:PLAY"L20T8BA
GFEDCBAGFEDCBAGFEDCAGFEDCAGFEDCA
GFEDCGFEDCGFEDCGFEDCFEDCFEDCFEDC
EDCEDCEDCDCDCDCCCCC
8 P=PEEK(65280):IFP=126ORP=254TH
EN9ELSE8
9 CLS:PRINT@226,"WITH THE JOYSTI
CK, CHOOSE A        LEVEL OF DIFFI
CULTY, THEN             PRESS THE FI
RE BUTTON":PLAY"P1
10 LEV=INT(JOYSTK(0)/7.4)+1:PRIN
T@202,"LEVEL =";LEV
11 P=PEEK(65280):IFP=126ORP=254T
HEN12ELSE10
12 CLS1:PRINT@227,"YOU WILL BEGI
N IN A MOMENT";:SCREEN0,1
13 MEN=3
14 PMODE4,2:PCLS:PMODE3:PCLS1
15 PMODE3:COLOR2:LINE(0,0)-(31,6
),PSET,BF:GET(0,0)-(31,6),P:PCLS
1
16 GET(0,0)-(80,20),E:PMODE3:COL
OR3:FORT=10TO20STEP2:LINE(T,4)-(
T+20,9),PSET:LINE(T+30,9)-(T+50,
4),PSET:LINE(T,34)-(T+20,29),PSE
T:LINE(T+30,29)-(T+50,34),PSET:N
EXTT:GET(0,0)-(80,20),E1:GET(0,2
0)-(80,40),E2:PCLS
17 PMODE3,4:FORT=40TO74:CIRCLE(1
28,144),T,3,.4:NEXTT:FORT=0TO20:
CIRCLE(128,144),T,2,.7:NEXTT:COL
OR2:LINE(0,140)-(70,134),PSET,BF
:LINE(255,140)-(185,134),PSET,BF
:LINE(0,148)-(70,154),PSET,BF:LI
NE(255,148)-(185,154),PSET,BF
18 PMODE3,1:LINE(0,12)-(15,22),P
RESET,BF:GET(0,12)-(15.22).E:DRA
W"BM8,12C3M0,21M15,21M7,12":PAIN
T(7,16),3,3:PMODE4:GET(0,12)-(15
```

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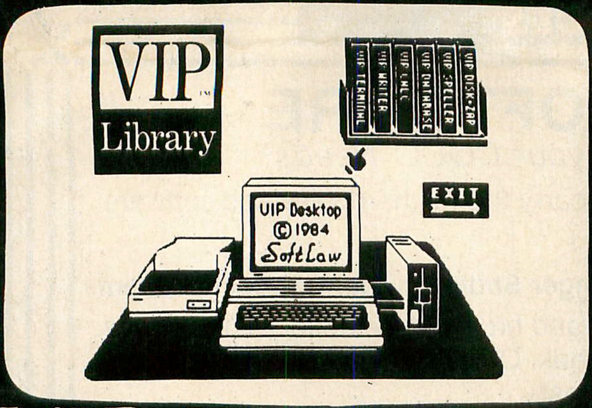

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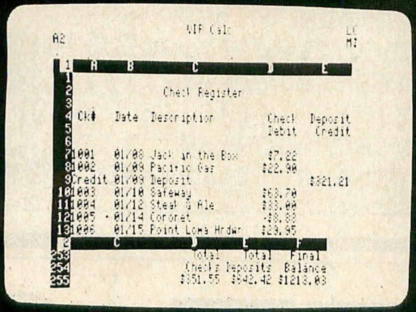

```
A2                 VIP Calc                     LC
                                                M?
 1  A      B           C              D       E
 1
 2                Check Register
 3
 4 Ck#    Date  Description         Check   Deposit
 5                                  Debit    Credit
 6
 7 1001   01/08 Jack in the Box     $7.22
 8 1002   01/08 Pacific Gas        $22.90
 9 Credit 01/09 Deposit                     $321.21
10 1003   01/10 Safeway            $63.70
11 1004   01/12 Steak & Ale        $33.00
12 1005 . 01/14 Coronet            -$8.83
13 1006   01/15 Point Loma Hrdwr   $29.95
 2            C           D        E        F
253                     Total    Total    Final
254                    Checks  Deposits  Balance
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```
,22),A:PUT(0,12)-(15,22),E
19 PCOPY7TO1:PLAY"L100T1000O2":PM
ODE4,2:SCREEN1,1:PMODE4,1:FORT=0
TO47:GET(0,T)-(255,T+32),E:PUT(0
,T+1)-(255,T+33),E:PLAY"FC":NEXT
T:PCOPY2TO1:PMODE4,2
20 RESTORE:FORT=0TO16:READ Y(T):
NEXTT
21 PMODE3,2:COLOR2:FORT=1TO(LEV*
28)STEP28:LINE(T,188)-(T+20,190)
,PSET,B:NEXTT:PMODE4,2
22 PMODE3,2:COLOR3:ON MEN GOSUB7
7,76,75
23 GET(0,33)-(255,46),E:SH=1:Y=1
60:X=120:R=RND(-TIMER)
24 J=JOYSTK(0):IFJ<15THENX=X-8EL
SEIFJ>48THENX=X+8
25 IFX<0ORX>240THENX=Q
26 IFRND(10-LEV)=1THENPUT(PX,172
)-(PX+31,178),E:PX=RND(20)*8:PUT
(PX,172)-(PX+31,178),P
27 PUT(Q,160)-(Q+15,170),E:PUT(X
,160)-(X+15,170),A:P=PEEK(65280)
:IFP=126ORP=254THENGOSUB39
28 IFTIMER>1500-(LEV*100)THENTIM
ER=0:GOSUB57
29 IFRND(12-LEV)=1THENGOSUB37
30 GOSUB34
31 SH=-SH:IFSH=-1THENPUT(EX,EY)-
(EX+80,EY+20),E1 ELSEPUT(EX,EY)-
(EX+80,EY+20),E2
32 PMODE3,2:COLOR3:LINE(0,184)-(
SCR/100,185),PSET,B:PMODE4,2
33 Q=X:GOTO24
34 EX=EX+((RND(3)-2)*8):IFEX<0OR
EX>172THENEX=QX
35 EY=EY+((RND(3)-2)*2):IFEY<30T
HENEY=30ELSEIFEY>120THENEY=120
36 QX=EX:RETURN
37 LINE(EX+35,EY+10)-(EX+35,170)
,PSET:LINE(EX+45,EY+10)-(EX+45,1
70),PSET:PLAY"L20T40O4BGEDC":IF(
EX+46>X AND EX+46<X+15)OR(EX+34>
X AND EX+34<X+15)THEN 59
38 LINE(EX+35,EY+10)-(EX+35,170)
,PRESET:LINE(EX+45,EY+10)-(EX+45
,170),PRESET:RETURN
39 IFX>=PX AND X<PX+20THEN59
40 IFX>EX AND X<EX+70THEN45
41 T=X/8:IFT<7ORT>23THENTY=0:GOS
UB74:RETURN
42 T=T-7:TY=Y(T):GOSUB74:IFY(T)=
0THEN44ELSEY(T)=Y(T)-4:LINE((T*8
)+60,Y(T))-((T*8)+67,Y(T)+8),PRE
SET,BF:SCR=SCR+50
43 IF(T>6AND T<10)AND Y(T)<10THE
```

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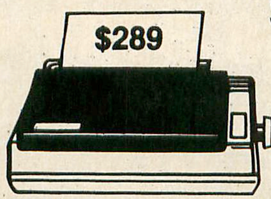

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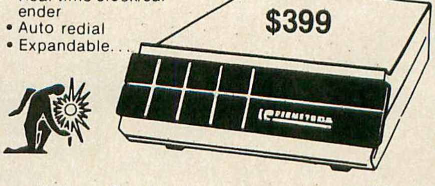

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```
N47
44 RETURN
45 SCR=SCR+20:TY=EY+5:GOSUB74:PL
AY"O1ABDGEFABDFE":PMODE4,2:FORT=
0TO18:PUT(EX+RND(80),EY+RND(20))
-(EX+RND(80),EY+RND(20)),E,NOT:N
EXTT
46 PUT(EX,EY)-(EX+80,EY+20),E:EX
=RND(20)*8:EY=RND(100)+32:RETURN
47 PMODE4,2:R=1:PLAY"T2L2":GET(1
08,0)-(149,11),D,G:FORT=0TO77:PU
T(108+R,0)-(149+R,11),D,PSET:PLA
Y"ET+":IFR=1THENR=0ELSER=1
48 NEXTT:PCOPY6TO1:PMODE4,1:GET(
0,15)-(255,80),E:FORT=15TO67STEP
2:PUT(0,T)-(255,T+65),E:PLAY"L10
0T50C":NEXTT:PMODE4,2:FORT=20TO1
50STEP4:PUT(0,T)-(255,T+65),E
49 PLAY"L100T20C":NEXT:PMODE4,2:
FORT=0TO4:X=RND(128)+64:Y=191-RN
D(32):FORR=3TORND(20)+10:CIRCLE(
X,Y),R,1,.9:CIRCLE(X,Y),R-3,0,.9
:NEXTR:PLAY"L50T50O1CEDCC":NEXTT
50 FORT=0TO30:PMODE3,2:SCREEN1,1
:PLAY"O3GEDC":PMODE4,2:SCREEN1,1
:PLAY"GEDC":NEXT
51 FORT=0TO16:INC=INC+((Y(T)-30)
*-.5)):NEXTT:CLS:PRINT@233,"BONUS
:":FORT=SCR TO SCR+INC:PRINT@24
0,T:PLAY"L15T8E":NEXTT:SCR=SCR+I
NC
52 SCREEN1,0:PCLS1:DRAW"C0BM80,4
0":I$="SCORE":GOSUB79:DRAW"BM128
,40":I$=STR$(SCR):GOSUB80:DRAW"B
M40,60":I$="ADVANCE@TO@NEXT@LEVE
L":GOSUB79
53 DRAW"BM36,80":I$="PRESS@FIRE@
TO@CONTINUE":GOSUB79:PLAY"L200T1
00"
54 C=RND(12):FORT=21TO1STEP-1:PL
AY"V"+STR$(T)+";"+STR$(C):P=PEEK
(65280):IFP=126ORP=254THEN55ELSE
NEXTT:GOTO54
55 PCLS:PLAY"V28":LEV=LEV+1:IFLE
V>9THENLEV=9
56 GOTO19
57 T=RND(16):IFY(T)>28THENRETURN
58 PMODE4,1:GET((T*8)+60,Y(T))-(
(T*8)+67,Y(T)+4),E:PMODE4,2:PUT(
(T*8)+60,Y(T))-((T*8)+67,Y(T)+4)
,E:Y(T)=Y(T)+4:GET(0,20)-(60,40)
,E:RETURN
59 PMODE4,2:PLAY"L10T8BGEDCAFDCG
EDCDCC":FORT=0TO3:Q=X+RND(40)-10
:W=Y+RND(20)-5:FORR=3TORND(10)+5
:CIRCLE(Q,W),R,1:CIRCLE(Q,W),R-3
```

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By Bernie Litton

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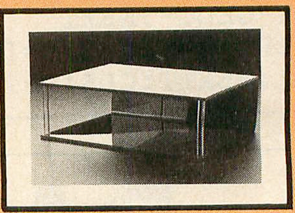

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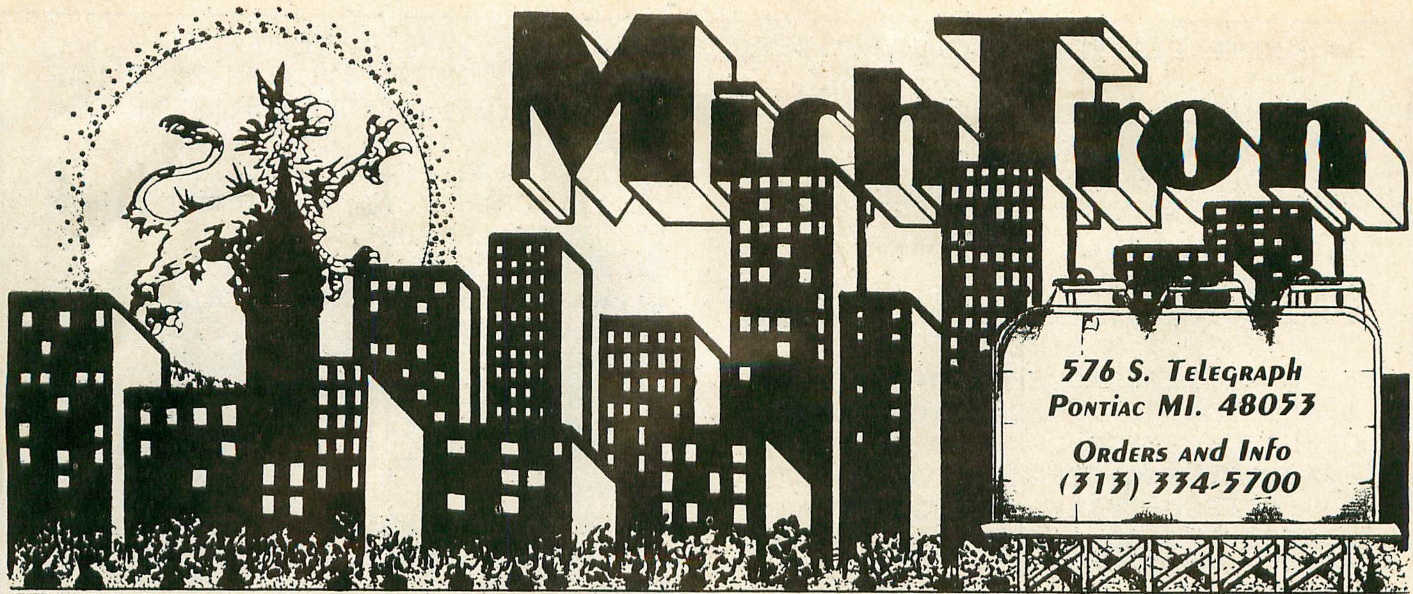

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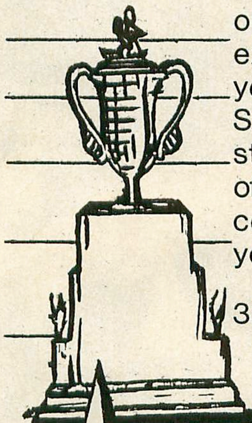
by Steven Hirsch



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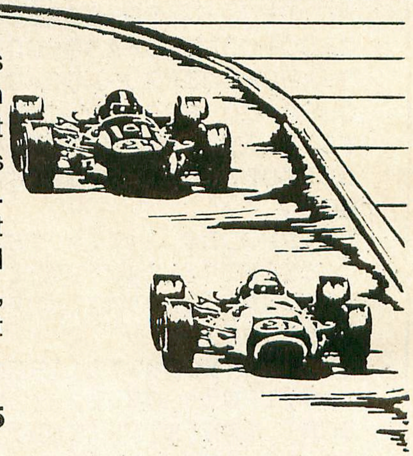

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ROMMEL 3-D

By Kary McFadden

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```
,0:NEXTR:PLAY"L20T20O1CEDC":NEXT
T
60 MEN=MEN-1:IFMEN<1THEN62
61 PMODE4,2:PCLS:GOTO18
62 PCOPY6TO1:PMODE4,1:GET(0,15)-
(255,80),E:FORT=15TO47STEP2:PUT(
0,T)-(255,T+65),E:PLAY"L100T50C"
:NEXTT:PMODE3,2:COLOR2:R=.8:X=0:
FORT=60TO191:LINE(128-X,T)-(128+
X,T),PSET:X=X+R:NEXTT
63 PLAY"L20T20CDEFGABO+CDEFGO-CD
EFABO+CDEFGO-CDEFGABO+CDEFGABO-C
DEFGABO+CDEFGO-DEFGABO+CDEFGO-DE
FGABO+CDEFGO-DEFGABO+CDEFGO-DEFG
ABO+CDEFGO-EFGABO+CDEFGO-EFGABO+
CDEFGO-EFGABO+CDEFGO-EFGABO+CDEF
GO-
64 PLAY"FGABO+CDEFGO-FGABO+CDEFG
O-FGABO+CDEFGO-FGABO+CDEFGO-GABO
+CDEFGO-GABO+CDEFGO-GABO+CDEFGO-
GABO+CDEFGO-ABO+CDEFGO-ABO+CDEFG
O-ABO+CDEFGO-ABO+CDEFGO-BO+CDEFG
O-BO+CDEFGO-BO+CDEFGO-BO+CDEFG
65 PLAY"CDEFGCDEFGCDEFGCDEFGDEFG
DEFGDEFGDEFGEFGEFGEFGEFGFGFGFGFG
GGGG
66 PMODE4,2:I$="THE@ENEMY@HAS@SU
CCEEDED":DRAW"BM32,4":GOSUB82:I$
="YOU@HAVE@FAILED":DRAW"BM64,50"
:GOSUB82
67 I$="YOU@WILL@RECEIVE@":DRAW"B
M48,120":GOSUB82:I$=RIGHT$(STR$(
SCR),LEN(STR$(SCR))-1):GOSUB80
68 I$="DOLLARS@FOR@YOUR@EFFORTS"
:DRAW"BM32,130":GOSUB82
69 I$="DO@YOU@WISH@TO@TRY@AGAIN"
:DRAW"BM32,150":GOSUB82:I$="@@YE
S@@@@@@@NO@@":DRAW"BM64,170":GOS
UB82
70 T=SGN(JOYSTK(0)-31):IFT=-1THE
NR=0ELSER=1
71 COLORR:LINE(132,168)-(196,178
),PSET,B:COLORR+1:LINE(124,168)-
(60,178),PSET,B
72 P=PEEK(65280):IFP=126ORP=254T
HEN73ELSE70
73 IFT=-1THENRUNELSECLS:PRINT"TH
IS IS THE END...":END
74 PMODE3,2:COLOR2:LINE(X+7,Y)-(
X+9,TY),PSET,B:PLAY"O2BGDC":LINE
(X+7,Y)-(X+9,TY),PRESET,B:RETURN
75 LINE(167,182)-(193,184),PSET,
B
76 LINE(197,182)-(223,184),PSET,
B
77 LINE(227,182)-(253,184),PSET,
B:RETURN
78 DATA16,24,24,28,28,28,32,32,3
2,32,32,28,28,28,24,24,16
79 FORT=1TOLEN(I$):Q$=MID$(I$,T,
1):R=ASC(Q$)-64:DRAWD$(R):NEXTT:
RETURN
80 FORT=1TOLEN(I$):Q=VAL(MID$(I$
,T,1)):DRAW N$(Q)+"BL7"+N$(Q)+"B
L":NEXTT:RETURN
81 FORT=1TOLEN(I$):Q$=MID$(I$,T,
1):R=ASC(Q$)-64:DRAWD$(R)+"S4BL2
9BUS16"+D$(R)+"S4BL29BUS16"+D$(R
)+"S4BL3BD2S16":NEXTT:RETURN
82 FORT=1TOLEN(I$):Q$=MID$(I$,T,
1):R=ASC(Q$)-64:DRAW"C0"+ER$+"C1
"+D$(R)+"BL7"+D$(R)+"BL":NEXTT:R
ETURN
83 DATA BR8,BRGD2NDR4NDU2HNL2BR5
,RNR3D4NLR3EHNLEBR3BU,BRR2NFL2GD
2FR2EBU3BR4
84 DATA RNR2D4NLR2EU2HBR5,NR4D2N
R3D2R4BR4BU4,NR4D2NR3D2BR8BU4,BR
1NR3GD2FR3ENL2BR3BU3,D2ND2R4ND2U
2BR4
```

```
85 DATA BR2NLNRD4NLRBR5BU4,BR4D3
GL2NHBR7BU4,D2ND2RNE2F2BR5BU4,D4
R4BR4BU4,ND4F2E2ND4BR4
86 DATA ND4F4U4BR4,NR4D4R4U4BR4,
ND4R3FGNL1BR5BU2,BRNR2GD2FR2ENFN
HU2BR4BU,"ND4R3FDGLM+2,+1BU4BR4"
87 DATA BR4L3GFR3FGL3BR7BU4,R2ND
4R2BR4,D3FR2EU3BR4,D2F2E2U2BR4,D
4E2F2U4BR4
88 DATA F4H2G2E4BR4,DF2NDE2UBR4,
R4G4R4BU4BR4
89 DATA BRGD2FR2EU2HNLBR5,BR2NGD
4NLRBR5BU4,BDER2FDL3GDR4BR4BU4
90 DATA BDER2FGFGL2NHBR7BU4,D2R4
ND2NU2R1BR3BU2,NR4D2R3FGL3BR8BU4
91 DATA BR4L3GD2FR3EHNL3BR4BU2,R
4G2D2BR6BU4,BRNR2GFGFR2EHEBR4BU1
,BR3NFL2GFR3NUDGL2BR7BU4
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housands of 'Real Talker' owners know 'Real Talker' beats ALL ther Coco voice synthesizers in ease of use and flexibility. And, IO other Coco talker has a clearer, *more* intelligible voice. hat's quite a lot of advantage when you consider Real Talker's nbeatable price. Yet, Real Talker has some important features at you simply will not find in other Coco talkers:

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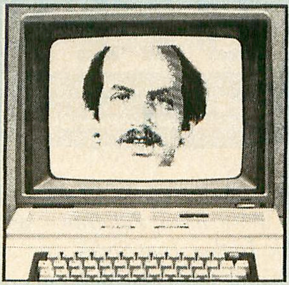
TALKHEAD

f you have a 'Real Talker', do not deprive yourself of this absolutely incredible machine-language Talking Head simulation program. While other alking head simulations use a minimal cartoonike face, TALKHEAD uses high resolution, fullcreen, digitized images of an actual person's face o create a life-like animated effect.



ACTUAL UNRETOUCHED PHOTO

SOFTWARE FOR THE 'REAL TALKER'

TALKHEAD can be easily commanded in Basic to appear on screen and say anything you want. Available on cassette or disk for only $19.95, TALKHEAD requires 64K and a Colorware 'Real Talker'.

ONLY $19.95

COLORWARE

COLORWARE INC.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA
MasterCard

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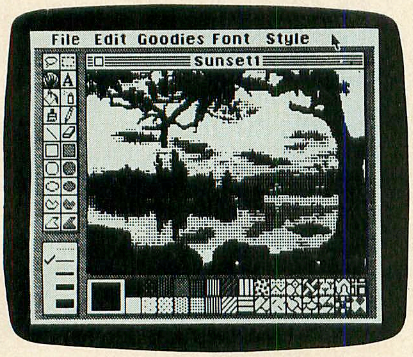
N.Y. RESIDENTS MUST ADD SALES TAX.

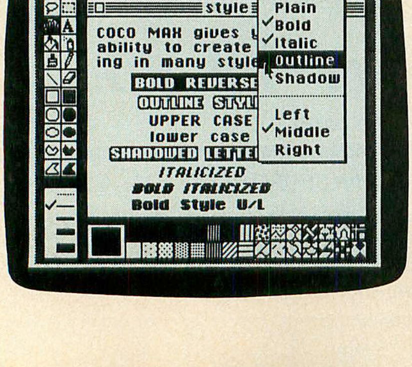
CoCo Max

This is one of those rare programs that will captivate everyone in your family.... No one can see CoCo Max and not want to try it!


File Edit Goodies Font Style
Sunset1

We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

It was inevitable that this exciting approach would be brought to the CoCo. With this in mind, Colorware chose to go all out and maximize this new concept for the color computer. That meant designing not just software but hardware too. It meant thousands of hours of pure machine language programming. Rarely has this much effort been applied to one product for the Color Computer.


File Edit Goodies Font Style
style
Plain
✓Bold
✓Italic
Outline
Shadow
Left
✓Middle
Right
COCO MAX gives y
ability to create
ing in many style
BOLD REVERSE
OUTLINE STYL
UPPER CASE
lower case
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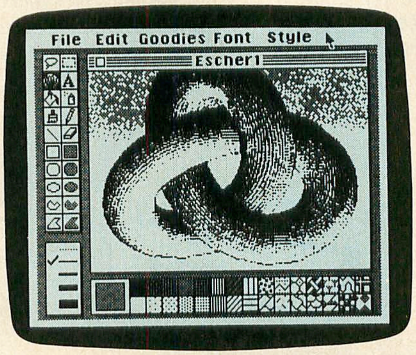
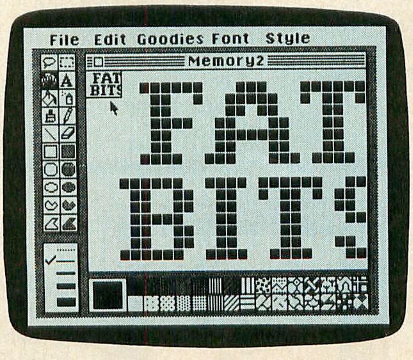
BOLD ITALICIZED
Bold Style U/L


File Edit Goodies Font Style
Escher1

UNMATCHED CAPABILITY...

Because we took the maximum approach: highly optimized machine code combined with hardware, CoCo Max truly stands above the rest as the ultimate creative tool for the Color Computer. It's unrivaled performance lets you create with more brilliance and more speed than any similar system – much more than you ever imagined possible. And, you can do it in black & white or color.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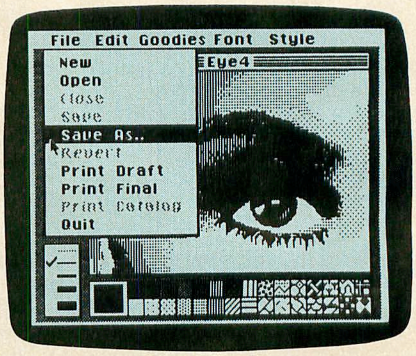
Memory2
FAT BITS
FAT
BITS

All the sophisticated power of the bigger systems is there: *Icons, Pull-Down Menus,* full *Graphic Editing, Font Styles,* and all kinds of handy tools and shortcuts.

Plug your joystick, mouse or touch pad into CoCo Max's Hi-Res Input Unit. Then use a delightfully simple *Point-and-Click* method to get any of CoCo Max's powerful graphic tools. It has them all: You can *Brush, Spray* or *Fill* with any *Color, Shading* or *Pattern.* Use *Rubber Band Lines* and *Shapes* (square, rectangle, circle, elipse, etc.) to create perfect illustriations with speed and ease. There's a *Pencil,* an *Eraser* and even a selection of *Caligraphy Brushes.* And, as you can see, CoCo Max can do a lot with text.

All of the newest special effects are there: *Trace Edges, Flip, Invert, Brush Mirrors,* etc. And all of the very latest super-capabilities like: *Undo,* which automatically reverses your mistakes, and *Fat Bits* which zooms you way in on any part of your subject to allow dot-for-dot precision.


File Edit Goodies Font Style
Eye4
New
Open
Close
Save
Save As..
Revert
Print Draft
Print Final
Print Catalog
Quit

THE BIG PICTURE

The large image box in the middle of the CoCo Max screen is actually only a window on an even larger image. Use the Point-and Click "Hand" to effortlessly move your window over any portion of the larger image. You have a working area of up to 3-½ times the area of the window itself.

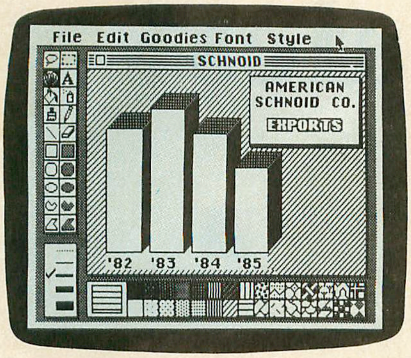
FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than ¼ page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to ⅛ page size.

THE COCO MAX SYSTEM

FREEDOM TO CREATE...

Anyone who wants to create anything at all on their CoCo screen or printer will certainly be very glad to meet CoCo Max. CoCo Max's friendly yet sophisticated graphic and text capabilities let you almost instantly produce illustrations, diagrams, charts,



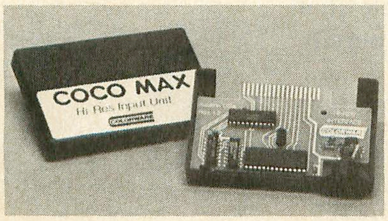
graphs, and computer art – for serious use or just for creative fun.

AN ABSOLUTE GUARANTEE

CoCo Max is a hardware/software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 20 days for a full, courteous refund from Colorware.

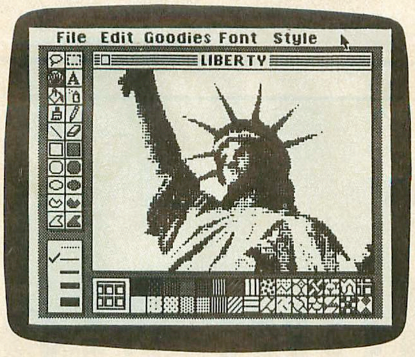
THE HARDWARE...

This is the key to CoCo Max's unmatched performance. Did you know the normal joystick input built into the Color Computer only allows access to 4,096 (64 x 64) points on the CoCo screen? Yet, the Color Computer's high resolution screen

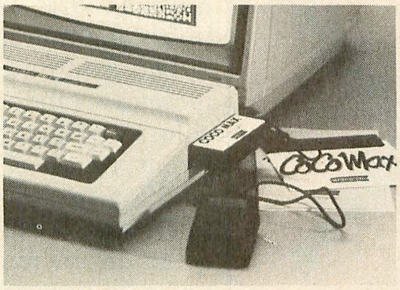


has 49,152 (256 x 192) pixels. This means that a joystick, mouse or even a touch pad can, at best, only access about one tenth of the pixels on the CoCo screen.

Most graphic programs ignore this hardware limitation of the Color Computer and give you only low-res control. Others attempt to overcome the limitation by using software schemes such as sliding windows. Although clever, these schemes yield sluggish and awkward results. Only CoCo Max does it the right way. The CoCo Max Hi-Res Input Unit plugs into your ROM slot and adds an entirely new joystick input to your computer – a precision one with a 49,152 point resolution to match the CoCo screen exactly.

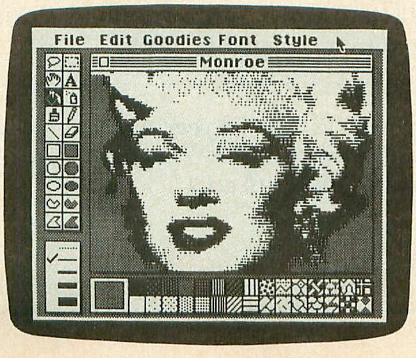


Plug your same joystick, mouse or touch pad into this new input and you have a whole new kind of control. The difference is remarkable.

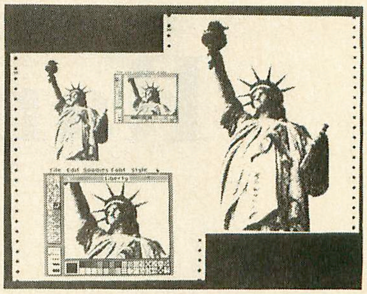


A DIGITIZER OPTION...

We studied all the video digitizers available and picked the best of them to link with CoCo Max. The DS-69 from Micro Works was our choice. This optional device lets you capture the image from any video source (video recorder, camera, etc.) on your Color Computer.



You may then use CoCo Max's graphic magic on it. The DS-69 is available as an option from Colorware from $149.95 complete with its own software on disk or tape. Using the DS-69 with a disk requires an RS multi-pak adaptor.



COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

THE COMPLETE COCO MAX SYSTEM, with software on *DISK* ***$69.95***

with software on *CASSETTE* (Available Mar '85)........................ ***$69.95***

Y-BRANCHING CABLE-If you have a disk system but do not have a Multi-Slot Interface, use this economical 40-pin, 1 male, 2 female cable to connect the CoCo Max Hi-Res input unit and your disk controller to your CoCo..... ***$27.95***

Sorry, COCO MAX is not compatible with JDOS

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16K
ECB

Random Mosaics

By Bob and Daniel Delbourgo

Random Mosaics is a very simple program which works entirely in the low resolution graphics mode. It was inspired by the mosaics one often sees on floors and murals.

The computer draws the mosaics at random with various colors and patterns. Nine different types of mosaics (in addition to the title card mosaic) have been devised and come in increments of just under 10 lines each.

Line 9 makes the random selection and subroutine 100 ensures that colors are distinct to bring out the best in the profiles. If you do not like the patterns you can easily add a few more mosaics of your own by altering Line 9 appropriately.

Notice the high-speed poke in Line 1 and delete it if your computer cannot handle it. Type in the program, RUN it and enjoy the ever changing scenery.

(For questions regarding this program, the Delbourgos can be contacted at 15 Willowdene Avenue, Sandy Bay, Hobart, Tasmania, Australia 7005)

(Daniel Delbourgo is the 13-year-old son of Bob Delbourgo who is an Australian physicist. They have fun collaborating on creating special graphics effects.)

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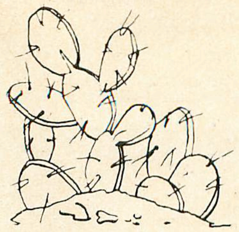
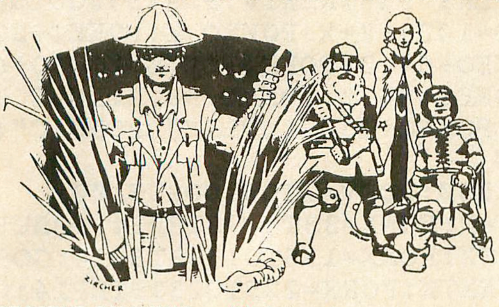


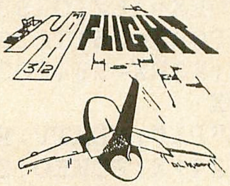


TO PRESERVE QUANDIC — Hint sheet

If you have not been able to **PRESERVE QUANDIC** you will be happy to hear that our hint sheets are now available. It is fully coded to give you only the information you wish to decode. **$3.95**

LIZPAC — STATISTICS

Absolutely the most complete statistics package we have seen for **ANY** computer anywhere. Lizpac is 850,000 Bytes of programming filling 7 disks with an eighth disk containing data files to be used in the examples. The 200 page manual completely explains all that Lizpac has to offer. Write for more information. Req. 32K disk only. **$195.00**



FLIGHT SIMULATORS

Flight — This graphics flight simulator gives you four levels of difficulty from student level to instrument only landing. The high resolution graphics screen shows your instruments and two representations of your plane in relation to the flight path. When you bring your plane in the synthesized voice from the tower says "perfect landing!". This program was written by a professional pilot and it shows! Req. 32K and a joystick. **Tape — $24.95; Disk — $29.95**

JUMBO JET

Take off from one airport, fly to another, and land safely, using full instruments and a thru the window view. It takes two joysticks to fly the mighty 747C Jumbo Jet. To complete this graphics simulation successfully, you must not only make a satisfactory take-off and landing, but turn the plane 180 degrees, land on a diagonal airstrip, and do all of this without running out of fuel, crashing or subjecting the plance to excessive amounts of stress damage. Req. 32K EB. **Tape — $24.95; Disk — $29.95**

MICROARTIST

Finally!!! a graphics program so easy to use anyone can create beautiful detailed pictures. Save your pictures to tape or disk and incorporate your artwork in your own programs or print it out on your printer. The ease menu selection provides **16** modes of operation including zoom, get/put, paint, text, erase and much more. Take advantage of all the COLOR your color computer has to offer. Order **MICROARTIST** now! Req. 32K EB and a mouse or joystick. **Tape — $24.95; Disk — $29.95**

SUPER ASTROLOGY

SUPER ASTROLOGY

This program calculates complete natal horoscopes to an accuracy of approximately one minute of arc. All you need to know is the time and place of birth. Req. 32K. **Tape — $24.95; Disk — $29.95**

SCEPTER
OF
URSEA

SCEPTER OF URSEA

Explore the kingdom of Ursea in search of the elusive sceptor. The country-side is represented by an elaborate graphics screen which harbors friend and for alike. Or enter the dark dungeons, where unknown dangers and wealth await you. Roll up your character and set out on a great adventure. Req. 32K EB. **Disk only — $29.95**

CITY WAR

Strategy and politics are the key to winning **CITY WAR.** The object is to eliminate the leader of the opposing country. There are 14 commands accessed by a single key stroke. With your secret access code you are the only one that can command your army of missiles. You can even request a cease fire from your opponent. The "save the game" feature makes it easy to resume negotiations. **Tape — $24.95; Disk — $29.95**

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12	67
31	159
38	99
50	99
64	166
75	183
83	174
92	100
END	80

The listing: MOSAIC

```
1 CLS0:POKE65495,0:S$="L40O3CO2B
AGFEDC":PRINT@448,"RANDOM MOSAIC
S BY D&R DELBOURGO";:PRINT@480,"
hobart, tasmania, australia7005"
;:FORV=1TO5:GOSUB100
2 Z=R:FORY=0TO384STEP128:FORX=1T
O25STEP6:GOSUB6:NEXTX,Y
3 Z=S:FORY=0TO256STEP128:FORX=33
TO57STEP6:GOSUB7:NEXTX,Y
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TO93STEP6:GOSUB8:NEXTX,Y
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:POKEO+34+W,Z:NEXTW:PLAY"L255O2C
":RETURN
7 O=1024+Y+X:FORW=0TO1:POKEO+W,Z
:POKEO+32+W,Z:POKEO+34+W,Z:POKEO
+64+W,Z:NEXTW:PLAY"L255O2E":RETU
RN
8 O=1024+Y+X:FORW=0TO1:POKEO+W,Z
:POKEO+30+W,Z:POKEO+32+W,Z:POKEO
+64+W,Z:NEXTW:PLAY"L255O2G":RETU
RN
9 A=RND(9):ONA GOTO10,20,30,40,5
0,60,70,80,90
10 CLS0:FORV=1TO5:GOSUB100
11 Z=R:FORY=65TO449STEP128:FORX=
0TO24STEP8:GOSUB16:NEXTX,Y
12 Z=S:FORY=37TO421STEP128:FORX=
0TO16STEP8:GOSUB17:NEXTX,Y
13 Z=T:FORY=129TO385STEP128:FORX
=0TO24STEP8:GOSUB16:NEXTX,Y
14 Z=U:FORY=101TO357STEP128:FORX
=0TO16STEP8:GOSUB17:NEXTX,Y
15 PLAY"P1":NEXTV:PLAYS$:GOTO9
16 O=1024+Y+X:POKEO,Z:POKEO+1,Z:
POKEO+3,Z:POKEO+4,Z:POKEO-31,Z:P
OKEO-30,Z:POKEO-29,Z:POKEO-62,Z:
PLAY"O2L255C":RETURN
17 O=1024+Y+X:POKEO,Z:POKEO+1,Z:
POKEO+3,Z:POKEO+4,Z:POKEO+33,Z:P
OKEO+34,Z:POKEO+35,Z:POKEO+66,Z:
PLAY"O2L255G":RETURN
20 CLS0:FORV=1TO5:GOSUB100
21 Z=R:FORY=0TO194STEP194:FORX=3
3TO57STEP6:GOSUB26:NEXTX,Y
22 Z=S:FORY=0TO188STEP188:FORX=3
6TO60STEP6:GOSUB26:NEXTX,Y
23 Z=T:FORY=0TO194STEP194:FORX=1
30TO154STEP6:GOSUB26:NEXTX,Y
24 Z=U:FORY=0TO188STEP188:FORX=1
33TO157STEP6:GOSUB26:NEXTX,Y
25 PLAY"P1":NEXTV:PLAYS$:GOTO9
26 O=1024+Y+X:POKEO,Z:POKEO+32,Z
:POKEO+64,Z:POKEO+65,Z:POKEO+66,
Z:POKEO+96,Z:POKEO+98,Z:POKEO+12
8,Z:POKEO+130,Z:PLAY"L255O2C":RE
TURN
30 CLS0:FORV=1TO5:GOSUB100
31 Z=R:FORX=33TO47STEP14:GOSUB36
:NEXTX:FORX=136TO150STEP14:GOSUB
37:NEXTX:FORX=225TO239STEP14:GOS
UB36:NEXTX:FORX=328TO342STEP14:G
OSUB37:NEXTX:FORX=417TO431STEP14
:GOSUB36:NEXTX
32 Z=S:FORX=40TO54STEP14:GOSUB36
:NEXTX:FORX=129TO143STEP14:GOSUB
37:NEXTX:FORX=232TO246STEP14:GOS
UB36:NEXTX:FORX=321TO335STEP14:G
OSUB37:NEXTX:FORX=424TO438STEP14
:GOSUB36:NEXTX
33 Z=T:FORX=69TO90STEP7:GOSUB39:
NEXTX:FORX=162TO183STEP7:GOSUB38
:NEXTX:FORX=261TO282STEP7:GOSUB3
9:NEXTX:FORX=354TO375STEP7:GOSUB
38:NEXTX
34 PLAY"P1":NEXTV:PLAYS$:GOTO9
36 O=1024+X:POKEO,Z:POKEO+1,Z:PO
KEO+3,Z:POKEO+4,Z:POKEO+5,Z:POKE
O+6,Z:POKEO+32,Z:POKEO+35,Z:POKE
O+38,Z:POKEO+64,Z:POKEO+65,Z:POK
EO+66,Z:POKEO+67,Z:POKEO+69,Z:PO
KEO+70,Z:PLAY"O2L255C":RETURN
37 O=1024+X:POKEO,Z:POKEO+1,Z:PO
KEO+2,Z:POKEO+3,Z:POKEO+5,Z:POKE
O+6,Z:POKEO+32,Z:POKEO+35,Z:POKE
O+38,Z:POKEO+64,Z:POKEO+65,Z:POK
EO+67,Z:POKEO+68,Z:POKEO+69,Z:PO
KEO+70,Z:PLAY"O2L255E":RETURN
38 O=1024+X:POKEO,Z:POKEO+1,Z:PO
KEO+33,Z:POKEO+65,Z:POKEO+96,Z:P
OKEO+97,Z:PLAY"O2L255G":RETURN
39 O=1024+X:POKEO,Z:POKEO+1,Z:PO
KEO+32,Z:POKEO+64,Z:POKEO+96,Z:P
OKEO+97,Z:PLAY"O3L255C":RETURN
40 CLS0:FORV=1TO5:GOSUB100
41 Z=R:FORY=0TO256STEP256:FORX=1
TO21STEP10:GOSUB46:NEXTX,Y:FORY=
128TO384STEP256:FORX=6TO26STEP10
:GOSUB46:NEXTX,Y
42 Z=S:FORY=0TO256STEP256:FORX=6
TO26STEP10:GOSUB46:NEXTX,Y:FORY=
128TO384STEP256:FORX=1TO21STEP10
:GOSUB46:NEXTX,Y
43 Z=T:FORY=0TO256STEP256:FORX=3
TO28STEP5:GOSUB47:NEXTX,Y
```

```
44 Z=U:FORY=128TO384STEP256:FORX
=3TO28STEP5:GOSUB47:NEXTX,Y
45 PLAY"P1":NEXTV:PLAYS$:GOTO9
46 O=1024+Y+X:POKEO,Z:POKEO+1,Z:
POKEO+3,Z:POKEO+4,Z:POKEO+32,Z:P
OKEO+36,Z:POKEO+64,Z:POKEO+68,Z:
POKEO+96,Z:POKEO+97,Z:POKEO+99,Z
:POKEO+100,Z:PLAY"L255O2C":RETUR
N
47 O=1024+Y+X:POKEO,Z:POKEO+31,Z
:POKEO+33,Z:POKEO+63,Z:POKEO+65,
Z:POKEO+96,Z:POKEO+32,Z-3:POKEO+
64,Z-12:PLAY"L255O2G":RETURN
50 CLS0:FORV=1TO5:GOSUB100
51 Z=R:FORY=0TO384STEP192:FORX=2
TO16STEP14:GOSUB56:NEXTX,Y:FORY=
96TO288STEP192:FORX=9TO23STEP14:
GOSUB56:NEXTX,Y
52 Z=S:FORY=0TO384STEP192:FORX=9
TO23STEP14:GOSUB56:NEXTX,Y:FORY=
96TO288STEP192:FORX=2TO23STEP14:
GOSUB56:NEXTX,Y
53 Z=T:FORY=0TO384STEP96:FORX=35
TO56STEP7:GOSUB57:NEXTX,Y
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56 O=1024+X+Y:POKEO,Z:POKEO+1,Z:
POKEO+2,Z:POKEO+4,Z:POKEO+5,Z:PO
KEO+6,Z:POKEO+32,Z:POKEO+34,Z:PO
KEO+35,Z:POKEO+36,Z:POKEO+38,Z:P
OKEO+64,Z:POKEO+70,Z:PLAY"L255O2
C":RETURN
57 O=1024+X+Y:POKEO,Z:POKEO+4,Z:
POKEO+32,Z:POKEO+33,Z:POKEO+34,Z
:POKEO+35,Z:POKEO+36,Z:POKEO+66,
Z:PLAY"L255O2G":RETURN
60 CLS0:FORV=1TO5:GOSUB100
61 Z=R:FORY=0TO384STEP128:FORX=0
TO24STEP8:GOSUB66:NEXTX,Y
62 Z=S:FORY=0TO384STEP128:FORX=3
3TO61STEP4:POKE1024+X+Y,Z:NEXTX,
Y:FORY=0TO256STEP128:FORX=71TO87
STEP8:GOSUB67:NEXTX,Y
63 Z=T:FORY=0TO384STEP128:FORX=3
9TO55STEP8:POKE1024+Y+X,Z:NEXTX,
Y:FORY=0TO256STEP128:FORX=67TO91
STEP8:GOSUB68:NEXTX,Y
64 PLAY"P1":NEXTV:PLAYS$:GOTO9
66 O=1024+X+Y:POKEO,Z:POKEO+1,Z:
POKEO+2,Z:POKEO+4,Z:POKEO+5,Z:PO
KEO+6,Z:POKEO+32,Z:POKEO+34,Z:PO
KEO+35,Z:POKEO+36,Z:POKEO+38,Z:P
OKEO+64,Z:POKEO+65,Z:POKEO+66,Z:
POKEO+68,Z:POKEO+69,Z:POKEO+70,Z
:PLAY"O2L255C":RETURN
67 O=1024+Y+X:POKEO,Z:POKEO+31,Z
:POKEO+32,Z:POKEO+33,Z:POKEO+64,
```

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```
Z:PLAY"L255O2E":RETURN
68 O=1024+Y+X:POKEO,Z:POKEO+30,Z
:POKEO+31,Z:POKEO+32,Z:POKEO+33,
Z:POKEO+34,Z:POKEO+64,Z:PLAY"L25
5O2G":RETURN
70 CLS0:FORV=1TO5:GOSUB100
71 Z=R:FORX=33TO57STEP6:FORY=0TO
224STEP224:GOSUB76:PLAY"L255O3C"
:NEXTY,X
72 Z=S:FORX=130TO154STEP6:FORY=0
TO224STEP224:GOSUB77:PLAY"L255O3
E":NEXTY,X
73 Z=T:FORX=102TO126STEP6:FORY=0
TO224STEP224:GOSUB78:PLAY"L255O3
G":NEXTY,X
74 Z=U:FORX=167TO191STEP6:FORY=0
TO224STEP224:GOSUB79:PLAY"L255O4
C":NEXTY,X
75 PLAY"P1":NEXTV:PLAYS$:GOTO9
76 O=1024+X+Y:FORP=0TO4:POKEO+P,
Z:NEXTP:POKEO-32,Z:POKEO+32,Z:PO
KEO-30,Z:POKEO+34,Z:POKEO-28,Z:P
OKEO+36,Z:RETURN
77 O=1024+X+Y:FORP=0TO4:POKEO+P,
Z:POKEO+P+64,Z:POKEO-32+32*P,Z:N
EXTP:POKEO-64,Z:POKEO+98,Z:RETUR
N
78 O=1024+X+Y:FORP=0TO3:POKEO-P,
Z:POKEO-32*P,Z:NEXTP:POKEO-34,Z:
RETURN
79 O=1024+X+Y:FORP=0TO3:POKEO-P,
Z:POKEO+32-32*P,Z:NEXTP:POKEO-4,
Z:RETURN
80 CLS0:FORV=1TO5:GOSUB100
81 Z=R:FORX=100TO124STEP8:FORY=0
TO192STEP192:GOSUB86:PLAY"L255O3
C":NEXTY,X:FORX=417TO441STEP8:FO
RP=0TO3:POKE1024+X+P,Z:NEXTP:POK
E1024+X+35,Z:NEXTX
82 Z=S:FORX=200TO216STEP8:FORY=0
TO192STEP192:GOSUB86:PLAY"L255O3
E":NEXTY,X:FORX=64TO88STEP8:FORP
=0TO3:POKE1024+X+P,Z:NEXTP:POKE1
024+X-32,Z:NEXTX:O=1216:GOSUB89:
O=1408:GOSUB89:FORP=0TO2:FORQ=0T
O192STEP192
83 POKE1183-P+Q,Z:POKE1247-P+Q,Z
:POKE1245+32*P+Q,Z:NEXTQ,P:Z=T:F
ORX=96TO120STEP8:FORY=0TO192STEP
192:GOSUB87:PLAY"L255O3G":NEXTY,
X
84 FORX=38TO62STEP8:FORY=0TO384S
TEP192:GOSUB88:PLAY"L255O4C":NEX
TY,X:FORX=130TO154STEP8:FORY=0TO
192STEP192:GOSUB88:PLAY"L255O4C"
:NEXTY,X
85 PLAY"P1":NEXTV:PLAYS$:GOTO9
86 O=1024+X+Y:FORP=-3TO3:POKEO+P
,Z:NEXTP:FORP=-64TO64STEP32:POKE
O+P,Z:NEXTP:FORP=0TO3:POKEO+64+P
,Z:POKEO-64-P,Z:NEXTP:FORP=0TO2:
POKEO+3-32*P,Z:POKEO-3+32*P,Z:NE
XTP:RETURN
87 O=1024+X+Y:POKEO,Z:POKEO+100,
Z:RETURN
88 O=1024+X+Y:POKEO,Z:POKEO+32,Z
:RETURN
89 FORP=0TO2:POKEO-32*P,Z:POKEO+
32*P,Z:POKEO+1+P,Z:POKEO+65+P,Z:
POKEO+3-32*P,Z::NEXTP:RETURN
90 CLS0:FORV=1TO5:GOSUB100
91 Z=R:FORX=3TO27STEP8:GOSUB96:N
EXTX:FORX=167TO183STEP8:GOSUB96:
NEXTX:FORX=323TO347STEP8:GOSUB96
:NEXTX:O=1215:GOSUB97:FORP=192TO
194:POKE1024+P,Z:POKE1088+P,Z:NE
XTP
92 Z=S:FORX=7TO23STEP8:GOSUB96:N
EXTX:FORX=163TO187STEP8:GOSUB96:
NEXTX:FORX=327TO343STEP8:GOSUB96
:NEXTX
93 O=1055:GOSUB97:O=1375:GOSUB97
:FORP=32TO34:POKE1024+P,Z:POKE10
88+P,Z:POKE1344+P,Z:POKE1408+P,Z
:NEXTP
95 PLAY"P1":NEXTV:PLAYS$:GOTO9
96 O=1024+X:FORP=0TO3:POKEO-P,Z:
POKEO+32+P,Z:POKEO+64-P,Z:POKEO+
96+P,Z:POKEO+128-P,Z:NEXTP:PLAY"
L255O3C":RETURN
97 FORP=0TO3:POKEO-P,Z:POKEO+64-
P,Z:POKEO+128-P,Z:NEXTP:POKEO+32
,Z:POKEO+96,Z:PLAY"L255O3C":RETU
RN
100 R=RND(8):S=RND(8):IFR=S THEN
100
101 T=RND(8):IFT=R THEN101
102 IFT=S THEN101
103 U=RND(8):IFU=R THEN103
104 IFU=S THEN103
105 IFU=T THEN103
106 R=16*R+127:S=16*S+127:T=16*T
+127:U=16*U+127:RETURN
```

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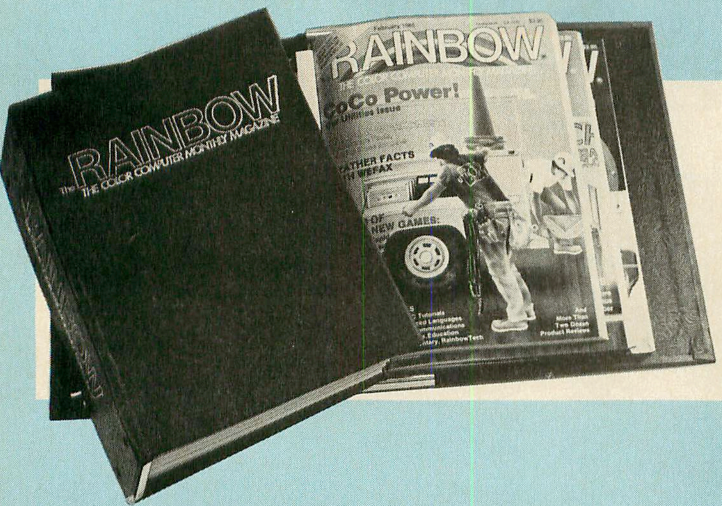

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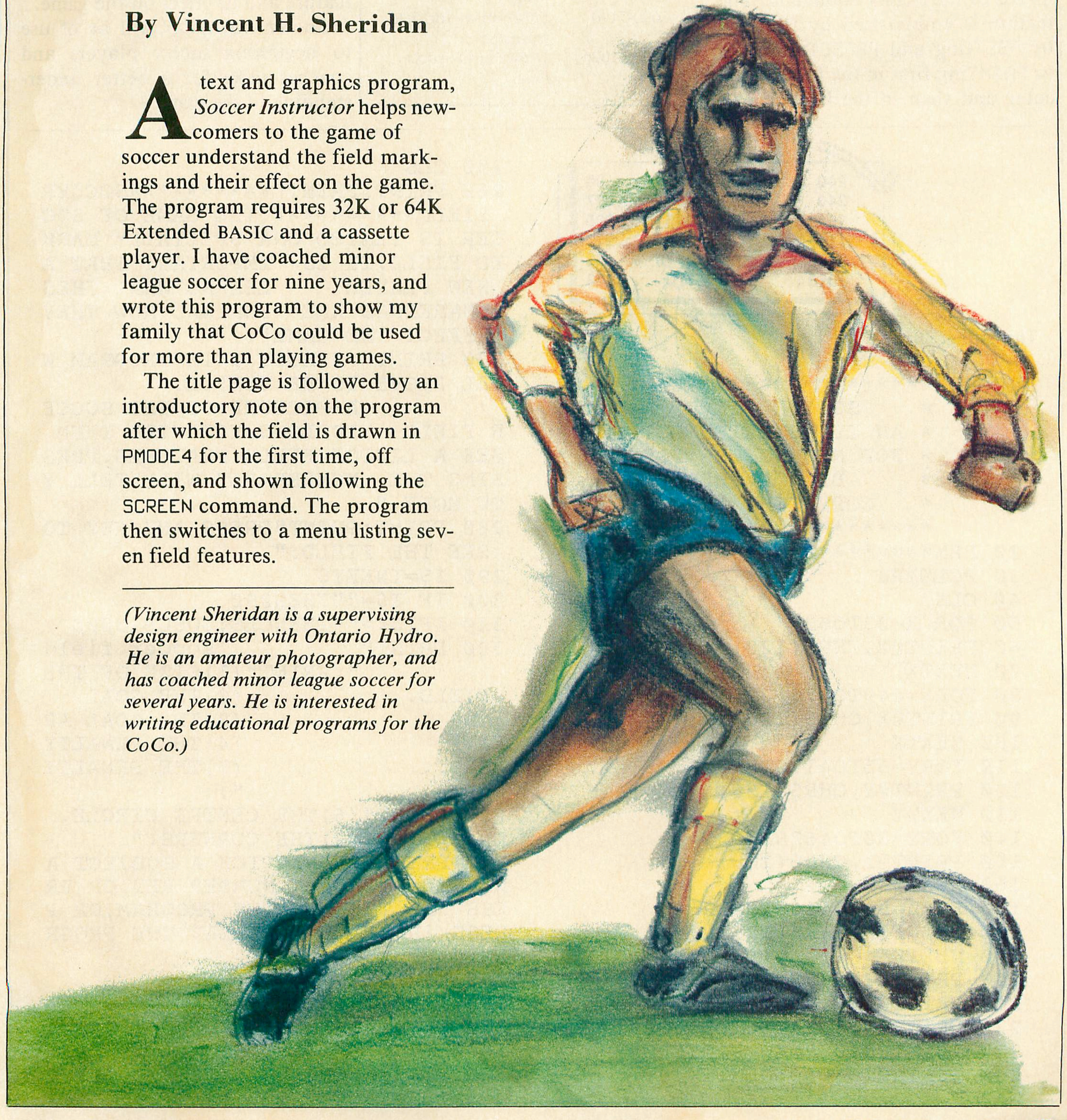
Soccer Instructor

By Vincent H. Sheridan

A text and graphics program, *Soccer Instructor* helps newcomers to the game of soccer understand the field markings and their effect on the game. The program requires 32K or 64K Extended BASIC and a cassette player. I have coached minor league soccer for nine years, and wrote this program to show my family that CoCo could be used for more than playing games.

The title page is followed by an introductory note on the program after which the field is drawn in PMODE4 for the first time, off screen, and shown following the SCREEN command. The program then switches to a menu listing seven field features.

(Vincent Sheridan is a supervising design engineer with Ontario Hydro. He is an amateur photographer, and has coached minor league soccer for several years. He is interested in writing educational programs for the CoCo.)



Program Structure

10-20	Credit
30	Reserves eight graphics pages
50-240	Title page
250-280	Introductory text
290-310	INKEY$ routine for branch to Line 10000 for field graphics subroutine
320-430	Menu
440	Branch to exit program
450	Branch to repeat program
1000-7190	Subroutines for field features
10000-10260	Draws initial soccer field

Selection of a feature will cause the field to be redrawn quickly by means of the PCOPY command. The feature is emphasized by flashing, by PSETting and PRESETting lines or PAINTing first in the foreground color and then in the background color. After five flashes, the text screen is shown to describe the field feature and its effect on the game.

Soccer Instructor will be of use to beginning soccer players and coaches alike for a better understanding of the game.

240	236	4000	98
340	54	6090	27
1010	95	7015	205
1111	184	7170	217
2140	222	10140	63
3050	114	END	223

The listing: SOCCER

```
10 REM**************************
      *    SOCCER FIELD        *
      * AN ILLUSTRATED GUIDE   *
      * FOR NEW SOCCER PLAYERS *
      *     BY V.A.SHERIDAN    *
      *   COPYRIGHT (C) 1985   *
      **************************
20 REM**************************
30 PCLEAR8
40 CLS
50 FOR X=33TO62
60 PRINT@X,CHR$(128)
70 NEXTX
80 FORX=449TO478
90 PRINT@X,CHR$(128)
100 NEXTX
110 FORY=65TO417STEP32
120 PRINT@Y,CHR$(128)
130 NEXTY
140 FORY=80TO462STEP32
150 PRINT@Y,CHR$(128)
160 NEXTY
170 FORZ=94TO446STEP32
180 PRINT@Z,CHR$(128)
190 NEXTZ
200 PRINT@131,"S O C C E R";
210 PRINT@164,"F I E L D";
220 PRINT@338,"A GUIDE FOR";
230 PRINT@370,"NEW PLAYERS";
240 FORT=0TO3000:NEXTT
250 CLS
260 PRINT:PRINT"**********SOCCER
 FIELD********** THE GAME OF SOC
CER IS PLAYED ONA SPECIALLY MARK
ED FIELD.IT IS  IMPORTANT THAT A
 NEW PLAYER     LEARNS WHAT THES
E MARKINGS ARE  FOR AND HOW THEY
 EFFECT THE GAME";
270 PRINT".I HOPE THIS PROGRAM W
ILL PROVE TO BE USEFUL.
          A PICTURE OF THE SOCCE
R FIELD   FOLLOWS,YOU WILL THEN
SEE A LISTOF FIELD FEATURES.PRES
SING THE  NUMBER KEY WILL TELL Y
OU MORE."
280 PRINT:PRINT"PRESS ANY KEY TO
 SEE THE FIELD."
290 I$=INKEY$
300 IF I$=""THEN290
310 IFI$<>""THENCLS:GOSUB10000
320 PRINT"          soccer field
          ":PRINT"(1)SIZE OF THE
 FIELD.           (2)THE GOAL.
                  (3)THE GOAL AR
EA.               (4)THE PENALTY
 SPOT.            (5)THE PENALTY
 AREA.            ";
330 PRINT"(6)THE CENTRE CIRCLE.
          (7)THE CORNERS."
340 PRINT:PRINT"PICK A SUBJECT A
ND PRESS THE    NUMBER KEY,OR PR
ESS 'E' TO END  THE PROGRAM,OR P
RESS 'R' TO     REPEAT THE PROGR
AM."
350 K$=INKEY$
360 IFK$=""THEN350
370 IFK$="1"THENSOUND200,2:GOSUB
1000
380 IFK$="2"THENSOUND200,2:GOSUB
```

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Sound Commands:	PLAY, SOUND
String Functions:	CHR$, LEFT$, MID$, RIGHT$, LEN, INSTR, LSET, RSET, TRM$, STR$, STRING$, INKEY$, MKN$
Numeric Functions:	ABS, POS, TIMER, RND, ASC, TAB, CAL, JOYSTK, PEEK, POKE, LOC, LOF, EOF, FREE, CVN, ERR, VARPTR, SWAP
I/O Commands:	OPEN, CLOSE, INPUT, LINEINPUT, PRINT WRITE, PRINT @, GET, PUT, KILL, CHAINM, FIELD, DATA, READ, RESTORE
Program Control:	FOR/NEXT/STEP, GOTO/GOSUB, IF/THEN/ELSE, RETURN, STOP, RETI, ON n GOTO/GOSUB, ON ERROR, ON RESET, ON IRQ/FIRQ/NMI, ON OVR/NOVR, EXEC, LET
Directives:	ORG, REM OR ', END, DIM, END, BASE, RAM, ON/OFF, RAM64K, HIRES, GENERATE, DPSET, STACK
Editor Commands:	LINE EDIT, AUTO EDIT, COPY, MOVE, RENUMBER, AUTO LINE#, PRINTER, LIST, DELETE, SEARCH, REPLACE, BAUD RATE, PRINTER, CBASIC, TAPPEND, SKIP, SIZE, LOAD, SAVE, APPEND, KILL, DIR, and much, much more.

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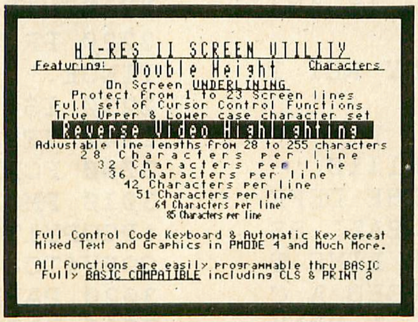

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PROGRAM FEATURES	HI-RES II NEW	HI-RES I OLD	BRAND X
Upper/Lower case characters	Yes	Yes	Yes
Mixed Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Black	Buff/Black	Buff/Black
X,Y Coordinate Cursor Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	No
16,32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatability	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	$24.95	$19.95	$29.95

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390 IFK$="3"THENSOUND200,2:GOSUB
3000
400 IFK$="4"THENSOUND200,2:GOSUB
4000
410 IFK$="5"THENSOUND200,2:GOSUB
5000
420 IFK$="6"THENSOUND200,2:GOSUB
6000
430 IFK$="7"THENSOUND200,2:GOSUB
7000
440 IFK$="E"THENCLS:PRINT@193,"N
OW YOU KNOW THE FIELD!!":PRINT@2
57,"HAVE A GOOD SOCCER SEASON!!"
:FORT=1 TO10000:NEXTT:CLS:END
450 IFK$="R"THENCLS:GOTO10
460 CLS:GOTO320
1000 FORN=1TO5
1010 PMODE4,5:COLOR0,1:SCREEN1,0
:PCOPY1TO5:PCOPY2TO6:PCOPY3TO7:P
COPY4TO8
1020 FORT=1TO500:NEXTT
1030 LINE(4,16)-(252,176),PRESET
,B:SOUND150,4:FORT=1TO500:NEXTT
1040 NEXTN
1050 PCLS
1060 CLS
1070 SCREEN0,0
1080 PRINT"*********SIZE OF FIEL
D**********"
1090 PRINT" THE FIELD IS 50 TO 1
00 YARDS   WIDE,AND 100 TO 130 Y
ARDS LONG. THE LINES AT THE GOAL
 ENDS OF   THE FIELD ARE CALLED
GOAL LINES,AND THE LINES DOWN TH
E SIDES OF THE FIELD ARE CALLED
SIDELINES."
1100 PRINT"IF THE ATTACKING TEAM
 KICKS THE BALL OVER THE GOAL LI
NE THE     DEFENDING TEAM IS AWA
RDED A GOALKICK."
1105 PRINT:PRINT"PRESS ANY KEY T
O CONTINUE."
1106 B$=INKEY$
1107 IF B$=""THEN1106ELSE1110
1110 CLS:PRINT:PRINT"IF THE DEFE
NDING TEAM TOUCHES   THE BALL BE
FORE IT CROSSES THE  GOAL LINE T
HE ATTACKING TEAM IS AWARDED A C
ORNER KICK.            IF A PLAY
ER CAUSES THE BALL TOCROSS THE S
IDELINE,THE OPPOSING TEAM IS AWA
RDED A THROW-IN."
1111 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."
1120 A$=INKEY$
1130 IFA$=""THEN1120ELSE RETURN
2000 PMODE4,5:COLOR0,1:SCREEN1,0
:PCOPY1TO5:PCOPY2TO6:PCOPY3TO7:P
COPY4TO8
2010 FORN=1TO5
2020 LINE(0,84)-(4,88),PRESET,BF
2030 LINE(0,104)-(4,108),PRESET,
BF
2040 LINE(0,84)-(0,108),PRESET
2050 LINE(256,84)-(256,108),PRES
ET
2060 LINE(256,104)-(252,108),PRE
SET,BF
2070 LINE(256,84)-(252,88),PRESE
T,BF
2080 FORT=1TO500:NEXTT
2090 LINE(0,84)-(4,88),PSET,BF
2100 LINE(0,104)-(4,108),PSET,BF
2110 LINE(0,84)-(0,108),PSET
2120 LINE(256,84)-(256,108),PSET
2130 LINE(256,104)-(252,108),PSE
T,BF
2140 LINE(256,84)-(252,88),PSET,
BF
2150 SOUND150,6
2160 NEXTN
2170 PCLS1
2180 CLS
2190 PRINT"***********THE GOAL*
***********"
2200 PRINT" THE GOALS ARE MADE O
F TWO      UPRIGHT GOALPOSTS AND
 A CROSSBAR.THEY CAN ONLY BE OF
WOOD OR    METAL,AND ARE PAINTED
 WHITE.     THE GOAL IS 8 YARDS(
24 FEET)   WIDE,AND 8 FEET HIGH.
           ";
2210 PRINT" THE USE OF NETS IS O
PTIONAL,   BUT CAN BE ENFORCED B
Y THE LOCALRULING BODY.
           FOR A GOAL TO BE SCO
RED,THE    BALL MUST BE COMPLETE
LY BEHIND  THE GOALINE."
2220 PRINT" PRESS ANY KEY TO CON
TINUE."
2230 I$=INKEY$
2240 IF I$=""THEN2230ELSERETURN
3000 FORN=1TO5
3010 PMODE4,5:COLOR0,1:SCREEN1,0
:PCOPY1TO5:PCOPY2TO6:PCOPY3TO7:P
COPY4TO8
3020 PAINT(10,96),0,0
3030 PAINT(246,96),0,0
3040 SOUND150,4:FORT=1TO500:NEXT
T
3050 NEXTN
3060 PCLS1
3070 CLS
3080 PRINT"*********THE GOAL ARE
A**********"
3090 PRINT" THE GOAL AREA IS DIR
ECTLY IN   FRONT OF THE GOAL.IT
```

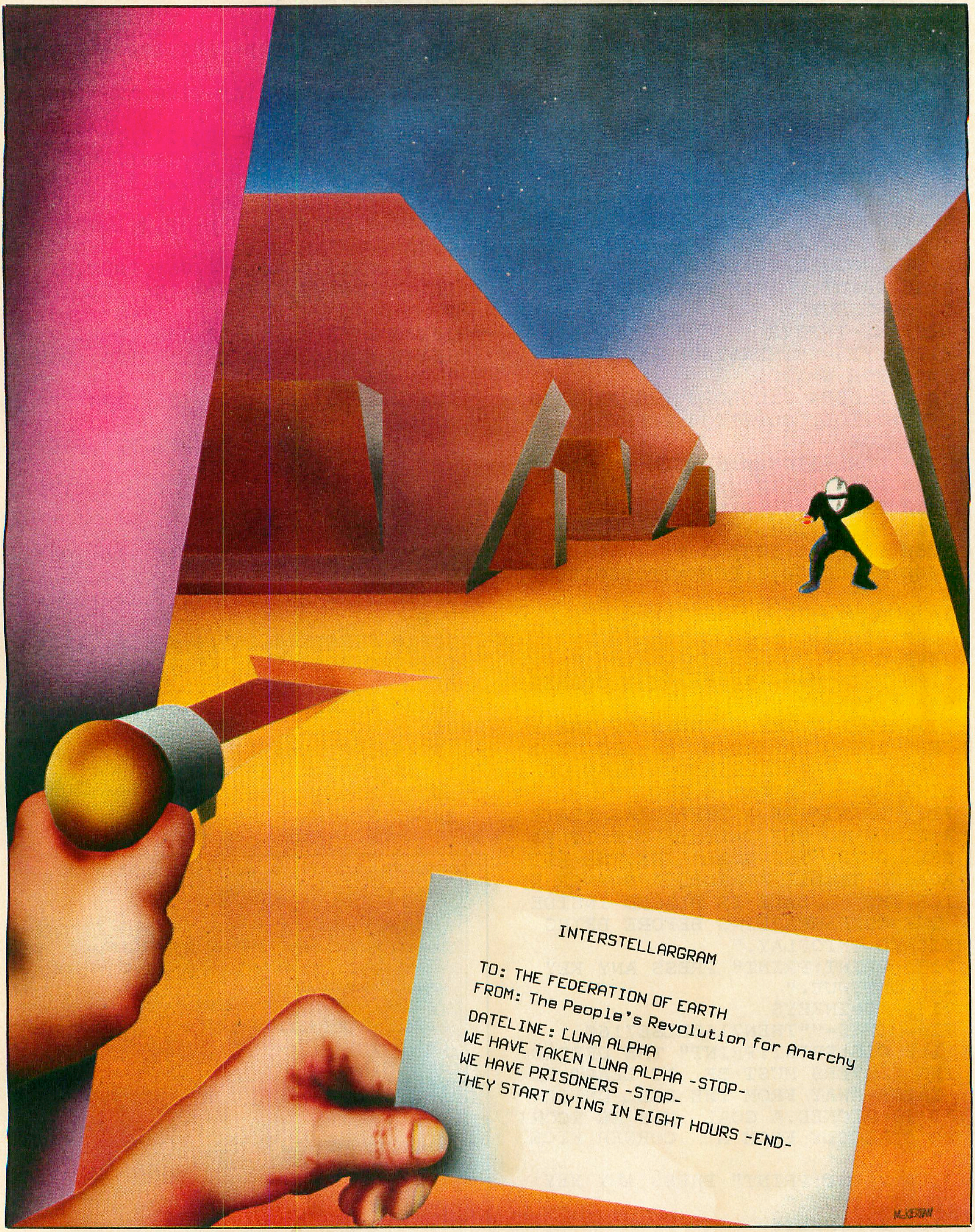
```
ND ONE TEAMIS GIVEN THE BALL.";
6100 PRINT"THE OPPOSING  TEAM MU
ST STAY IN THE OTHER HALFOF THE
FIELD AT LEAST 10 YARDS  AWAY FR
OM THE BALL."
6110 PRINT" PRESS ANY KEY TO CON
TINUE."
6120 I$=INKEY$
6130 IFI$=""THEN6120ELSE6140
6140 CLS:PRINT:PRINT" THE BALL M
UST BE KICKED INTO   THE OPPONEN
T'S HALF OF THE FIELD.THE KICKER
 CAN NOT TOUCH THE   BALL A SECO
ND TIME UNTIL IT HAS BEEN TOUCHE
D BY ANOTHER PLAYER."
6150 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."
6160 K$=INKEY$
6170 IFK$=""THEN6160ELSERETURN
7000 FOR N=1TO5
7010 PMODE4,5:COLOR0,1:SCREEN1,0
:PCOPY1TO5:PCOPY2TO6:PCOPY3TO7:P
COPY4TO8
7015 FORT=1TO500:NEXTT
7020 PAINT(5,17),0,0
7030 PAINT(251,17),0,0
7040 PAINT(251,175),0,0
7050 PAINT(5,175),0,0
7060 SOUND150,4:FORT=1TO500:NEXT
T
7070 NEXTN
7080 PCLS1
7090 CLS
7100 PRINT"**********THE CORNER
S**********"
7110 PRINT" THE CORNERS OF THE F
IELD ARE   MARKED BY AN ARC OF 1
 YARD      RADIUS,AND A FLAG OF
MINIMUM    HEIGHT 5 FEET."
7120 PRINT" IF A DEFENDING PLAYE
R TOUCHES  THE BALL BEFORE IT PA
SSES OVER  THE GOAL LINE,THE ATT
ACKING TEAMIS AWARDED A CORNER K
ICK.THE    BALL IS PLACED INSIDE
 THE CORNERMARKING BEFORE BEING
KICKED INTOPLAY."
7130 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."
7140 I$=INKEY$
7150 IFI$=""THEN7140ELSE7160
7160 CLS:PRINT:PRINT" THE DEFEND
ING PLAYERS MUST BE  AT LEAST 10
 YARDS AWAY FROM THE BALL UNTIL
IT IS KICKED.A GOAL  MAY BE SCOR
ED DIRECTLY FROM A   CORNER KICK
."
7170 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."
7180 K$=INKEY$
7190 IFK$=""THEN7180ELSERETURN
10000 PMODE4,1
10010 COLOR0,1
10030 PCLS1
10040 LINE(4,16)-(252,176),PSET,
B
10050 LINE(128,16)-(128,176),PSE
T
10060 LINE(4,52)-(40,140),PSET,B
10070 LINE(4,76)-(16,116),PSET,B
10080 CIRCLE(128,96),20,0
10090 CIRCLE(28,96),2,0
10100 CIRCLE(28,96),20,0,1,.875,
.125
10110 LINE(0,84)-(4,88),PSET,BF
10120 LINE(0,104)-(4,108),PSET,B
F
10130 LINE(0,84)-(0,108),PSET
10140 LINE(256,84)-(256,108),PSE
T
10150 LINE(256,104)-(252,108),PS
ET,BF
10160 LINE(256,84)-(252,88),PSET
,BF
10170 CIRCLE(228,96),20,0,1,.375
,.625
10180 CIRCLE(228,96),2,0
10190 LINE(252,76)-(240,116),PSE
T,B
10200 LINE(252,52)-(216,140),PSE
T,B
10210 CIRCLE(4,16),8,0,1,0,.25
10220 CIRCLE(252,16),8,0,1,.25,.
50
10230 CIRCLE(252,176),8,0,1,.5,.
75
10240 CIRCLE(4,176),8,0,1,.75,0
10245 SCREEN1,0
10250 FOR T=1 TO 10000:NEXT
10260 RETURN
```

Quickie . . .

Sinelines

If you want the graphics to move a bit faster or slower to match your preferred beat, then change the 'S' variable in Line 61 to, for example .05 for slower music. Experiment!

```
10 REM**SINLINES, BY NORM CUTTER
20 PCLS:PMODE 4,1:SCREEN1,1
60 B=B+I
61 S=S+.1
70 D=D+Q
80 IF B>250 THEN PCLS:I=-2
90 IF D>180 THEN Q=-2
92 IF D<5 THEN Q=2
93 IF B<5 THEN I=2
96 X=(SIN(S)*129)+129
100 LINE (X,D)-(D,B),PSET
150 GOTO60
```



INTERSTELLARGRAM

TO: THE FEDERATION OF EARTH
FROM: The People's Revolution for Anarchy
DATELINE: LUNA ALPHA
WE HAVE TAKEN LUNA ALPHA -STOP-
WE HAVE PRISONERS -STOP-
THEY START DYING IN EIGHT HOURS -END-

Save The Captive Scientists!

OPERATION FREEDOM

By Steve Britton IV

"This is the only message we have received from them," your superior says as he hands you the interstellargram. "The lives of almost 80 of the Earth's most brilliant scientists are at stake! That is why I have decided to send you, our best agent, to free as many of those people as you can, before it is too late . . ."

With these words ringing in your ears you now stand at the beginning of what seems to be a deserted lunar street. This is only one of the many that run throughout Luna Alpha, the first lunar colony of its kind, population: 80.

Operation Freedom will run on any 16K CoCo with Extended Color BASIC. The object of the game is to free as many captives as possible and safely escape without being killed by terrorist laser fire.

The playing screen is divided into three views. The largest is a map showing your position in Luna Alpha. At the bottom of the screen toward the middle is a side view of you as you run along the lunar streets. The smallest view, in the lower left corner of the screen, is the view of your laser weapon's targeting system.

You may move around the streets (yellow lines) of the map using the right joystick. Your position is indicated by the blue

(Steve Britton is a 16-year-old student who will be a senior at William Blount High School this fall. He is a self-taught programmer and has been developing programs for the past two and a half years.)

dot. The small red areas are the locations of captives being held prisoner by the terrorists. To free these captives, move up to an area that you have not been to yet and watch for the prison bars to appear on the side view and press the firebutton. The number of captives you have freed from this area is indicated under the word "FREED" located at the top right corner of the screen. The number of captives in an area will vary from one to six.

As you move around the deserted streets of Luna Alpha, you will encounter terrorists quite frequently. When a terrorist has been encountered, a red square will appear in the view of your targeting system. This square represents the relative position of the terrorist.

Notice the two rows of green dots running up and down and left to right along the two sides of this view. These are aim indicators. To aim at the terrorist, use the right joystick. Moving the joystick left and right controls the horizontal indicators, while moving the joystick up and down controls the vertical indicators. Align the blinking indicators up so when you fire, the point where the indicators intersect is on top of the red square.

On paper this sounds quite complex, but when you actually play a few times it becomes quite simple. Just hitting the red square will not kill the terrorist because the terrorists have developed a special armor. Keep firing, though, until you hit a weak spot. However, don't concentrate too deeply on killing the terrorist because he is firing at you, too! He will either shoot at your head or at your feet. When a terrorist fires, you will see the shot coming toward you (on the side view) at a speed determined by the skill level chosen at the beginning of the game (one is easy and five is hard). To dodge this shot, push the right joystick all the way up and press the firebutton to jump. Push the right joystick all the way down and press the firebutton to duck. Be sure to hold the firebutton down until the shot has safely passed.

All of this running and shooting can drain one's strength and ammunition supply rather quickly. Your strength and ammo are indicated by red lines at the lower right of the screen. When the red line under strength reads zero, you will die of fatigue. When your ammo reaches zero, you will not be able to shoot at terrorists; you will simply have to dodge any shots fired until the terrorist goes away. They usually only take a few shots and retreat anyway, so it is relatively easy to survive without ammunition.

The green areas on the map are the secret hideaways inhabited by th scientists who managed to escape th terrorists. Stop at these places to res and reload your laser weapon wit energy by moving up beside them unti a green figure appears in front of yo in the side view. When this occurs, hi the firebutton and your strength an ammo are now ready for combat onc again.

Free as many captives as you can being careful not to use too muc strength in the process and stop t restore your essentials until you reac your destination; the starbase where a escape ship awaits to "beam you up (located at the top left of the map an represented by a green star-like shape)

When you successfully complet Phase one by reaching the escape ship you then start over on Phase two. Afte each successful completion of a phase 1,000 bonus points are awarded. Th higher the phase, the harder the game For each phase you gain, the difficult factor will increase by one until i reaches five (the highest skill level). Fo beginners, I would recommend starting on Phase one or two to get used to the controls. Intermediates will find challenge on Level three, while experts will find levels four and five quite difficult to master.

Good luck!

120	94	8027	254
125	170	9000	189
155	207	10020	24
510	73	20020	18
1005	190	30010	130
7020	84	END	23

The listing: FREEDOM

```
0 CLS0:C$=CHR$(128):GOTO40000
1 PH=1:CLS0:PRINT@45,"PHASE 1";:
FORX=1TO500:SCREEN0,1:NEXTX
2 POKE140,150
99 PMODE1,1:PCLS3
100 DRAW"BM16,3C2R2D2R2L6BM9,8R2
F2R8F2H2L4D2R2L2D4R2D2R2F2D2BM14
,18D4L2BM16,8R2"
101 DRAW"BM38,3R2D2R2L6BM31,8R2F
2R8D2L4D4R2D2R4D2BM36,18D4L2BM38
,8R2"
102 DRAW"BM56,1R2D2R2L6BM54,8E2R
6F2H2L2D2L2D4L2D2R6D2"
103 DRAW"BM82,9R2D2R2L6BM80,14R6
D2L4D2L2H2F2D4L2R2U4R6D4R4"
104 DRAW"BM100,6R2F2G2L2U2D6U4R2
F2D2BM108,14R1BM112,6D8BM116,14R
1BM120,6D8U4R2E2H2L2BM100,20D2R1
4L2U2L4BM124,22L6R2U2R2"
105 DRAW"BM135,10C4R18D2L18R4D8L
4R18D2L18U2R8U8R4D8R4U8"
106 DRAW"BM162,7C1R4D2L4R2D4R2F2
H2L4H2F2R2D6R2D2R2D2BM160,22U2R2
U2"
110 DIMR1(1,2),R2(2,2),J(1,2),D(
1,2),K(2,2),P(1,2),H(1,2),IK(1,2
),IS(1,2),ZT(7,7)
120 GET(9,3)-(22,23),R1:GET(30,2
)-(45,23),R2:GET(54,1)-(65,16),J
:GET(76,9)-(90,22),D:GET(100,6)-
(125,22),K:GET(135,10)-(155,22),
P:GET(160,7)-(169,22),H
121 PCLS3:COLOR4,3:LINE(5,3)-(19
7,117),PSET,B:LINE(5,135)-(53,17
7),PSET,B:LINE(68,135)-(165,176)
,PSET,B
122 DRAW"BM184,106C1R2L4D2R4F2H2
U2E2G2L4H2F2D2G2E2U2R4U1C2U29L40
D26L38U26L42D26L36U50R40D10R38U3
0R48D18R20U40L76D24L58U18L24U8C1
R2L4U2R4E2G2L4H2F2D2G2E2R4F2H2BM
```

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```
183,133C2R6L6D4R6D4L6BM193,133R4
L2D8BM201,133R4D6F2H2U2L4D4U8BM2
11,133R6L6D4R2L2D4R6"
123 DRAW"BM168,79C2D8C4R2L4D2R4B
M145,76C1L2U2R2BM145,88C2L8C4U2L
2D4R2BM106,99C1L2U2D4L2U4BM84,79
C2D8C4R2D2L4BM65,80C1L2U2L2D4R2B
M47,100C2U8C4R2U2L4D2BM28,96C1L2
U2L2D4R2BM221,133C2D8U8F4R2D4U8B
M231,133R6D2U2L6D8R6U2R2L4BM243,
133R4L2D8BM251,133D8U4R4U4D8"
124 DRAW"BM31,64C2R8C4U2R2D4L2BM
52,55C2D8C4R2D2L4U2BM73,56C1R2U2
R2D4L2BM108,47C2R10D4C4R2D2L4U2B
M127,31C2U8C4R2U2L4D2BM132,35C1D
2R2D2L4U2BM174,35C2L6U6C4R2U2L4D
2BM151,12C2D10C4R2D2L4U2BM178,12
C1R2U2R2D4L2"
125 DRAW"BM98,19C2L6C4U2L2D4R2BM
71,32C2U8L8C4U2L2D4R2BM51,36C2D6
C4R2D2L4U2BM45,20C1R2U2R2D4L2BM2
3,16C2D20C4R2D2L4U2BM205,2C2R6L6
D8U4R2BM215,2R4D6F2H2U2L4D4U8BM2
25,2R6L6D4R2L2D4R6BM235,2R6L6D4R
2L2D4R6BM245,2R4F2D4G2L4U8"
126 DRAW"BM183,156C2G2D6U4R4U2D6
BM189,156D8U8R2D2R6U2L2D2G2E2R4D
6BM203,156D8U8R2D2R6U2L2D2G2E2R4
D6BM219,156G2D4F2E2U4H2BM103,16C
1R2U2R2D4L2":FORX=11TO47STEP4
127 PSET(X,137,1):NEXTX
128 FORY=139TO175STEP4
129 PSET(9,Y,1):NEXTY
130 COLOR2,3
131 IFPH>1ANDLQ<7THENLQ=LQ+1:GOT
O135
132 CLS:INPUT"LEVEL <1-5>";LQ:IF
LQ>5ORLQ<1THEN132ELSELQ=LQ+2
135 PRESET(X,Y):PLAY"V31O3T255":
SCREEN1,0
140 X=186:Y=100:C=222:OO=205:PP=
25:V=222:W=0
150 S=20:A=20
151 COLOR4,3:LINE(182,146)-(220,
148),PSET,B:LINE(174,168)-(220,1
70),PSET,B:COLOR2,3
152 PRESET(X,Y)
155 J=JOYSTK(0):J1=JOYSTK(1):IFY
=11THENY=10
156 IFX=18AND Y=10THEN20000ELSEI
FX=17AND Y=10THEN20000
157 PUT(139,150)-(150,170),R1:EX
EC43359:IFRND(11)=1THEN8000
158 IFPPOINT(X+2,Y)=1ORPPOINT(X-
2,Y)=1ORPPOINT(X,Y+2)=1ORPPOINT(
X,Y-2)=1THENRH=1:PUT(111,155)-(1
20,170),H:ELSEIFRH=1THENLINE(104
,155)-(120,170),PRESET,BF:RH=0
```

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```
159 IFPPOINT(X+2,Y)=4ORPPOINT(X-
2,Y)=4ORPPOINT(X,Y+2)=4ORPPOINT(
X,Y-2)=4THENPC=1:PUT(111,155)-(1
31,167),P ELSEIFPC=1THENLINE(111
,155)-(131,167),PRESET,BF:PC=0
160 IFJ=63ORJ=0ORJ1=0ORJ1=63THEN
500
165 IFTIMER>=100THEN600ELSEPUT(1
39,150)-(152,170),R2:EXEC43359:F
ORQ=1TO35:NEXTQ:LINE(139,150)-(1
56,170),PRESET,BF
170 PE=PEEK(65280):IFPE=126ORPE=
254THEN700ELSE155
500 IFRH=1ANDPEEK(65280)=126ORPE
EK(65280)=254THEN700ELSEIFJ=63T
HENIFPPOINT(X+2,Y)=2THENPSET(X,Y
):X=X+2:PRESET(X,Y):GOTO165
505 IFJ=0THENIFPPOINT(X-2,Y)=2TH
ENPSET(X,Y):X=X-2:PRESET(X,Y):GO
TO165
510 IFJ1=63THENIFPPOINT(X,Y+2)=2
THENPSET(X,Y):Y=Y+2:PRESET(X,Y):
GOTO165
515 IFJ1=0THENIFPPOINT(X,Y-2)=2T
HENPSET(X,Y):Y=Y-2:PRESET(X,Y):G
OTO165
520 GOTO165
600 TIMER=0:S=S-1:C=C-2:PSET(C,1
46,2):PSET(C,148,2):IFC=182THEN5
000ELSEGOTO165
700 Q=RND(5):FD=FD+Q:FORZ=1TOQ:S
OUND(Z*30),1:LINE(OO,PP)-(OO+3,P
P+2),PSET,B:OO=OO+8:IFOO>=245THE
NPP=PP+6:OO=205
701 IFPPOINT(X+2,Y)=4THENPSET(X+
2,Y,3):PSET(X+3,Y,3)
702 IFPPOINT(X-2,Y)=4THENPSET(X-
2,Y,3):PSET(X-3,Y,3)
703 IFPPOINT(X,Y+2)=4THENPSET(X,
Y+2,3):PSET(X,Y+3,3)
704 IFPPOINT(X,Y-2)=4THENPSET(X,
Y-2,3):PSET(X,Y-3,3)
705 NEXTZ:SC=SC+(7*Q):GOTO155
800 V=V-2:PSET(V,168,2):PSET(V,1
70,2):RETURN
1000 XT=RND(30)+11:YT=RND(33)+13
8
1005 LINE(XT,YT)-(XT+3,YT+3),PSE
T,BF
1010 AZ=1
1015 GOTO170
5000 LINE(139,150)-(150,170),PRE
SET,BF:PUT(131,154)-(156,170),K:
FORX=1TO15:PLAY"T25CCA":NEXTX
```

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SOLDERLESS UPGRADE KITS

With easy-to-follow instructions

64K FOR E BOARD	$39.95
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64K FOR COCO2*	$29.95

*New CoCo2 Model 26-3134/36 requires one solder joint.

NOTE: All ICs used in our kits are first quality 150 NS prime chips and carry one full year warranty.

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DISK BASIC UNRAVELLED	$19.95
ALL 3 BOOKS ONLY	$49.95

SPECIAL OF THE MONTH

P51 MUSTANG

TAPE	DISK
$19.95	$21.95

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HJL.57 KEYBOARD	$79.95

Take a closer look. . .

	TAPE	DISK
DYNACALC	–	$74.95
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32K GAMES

	TAPE	DISK
P51 MUSTANG	$23.95	$27.95
Optional Cable	$9.95	
SAILOR MAN (64K)	$23.95	$27.95
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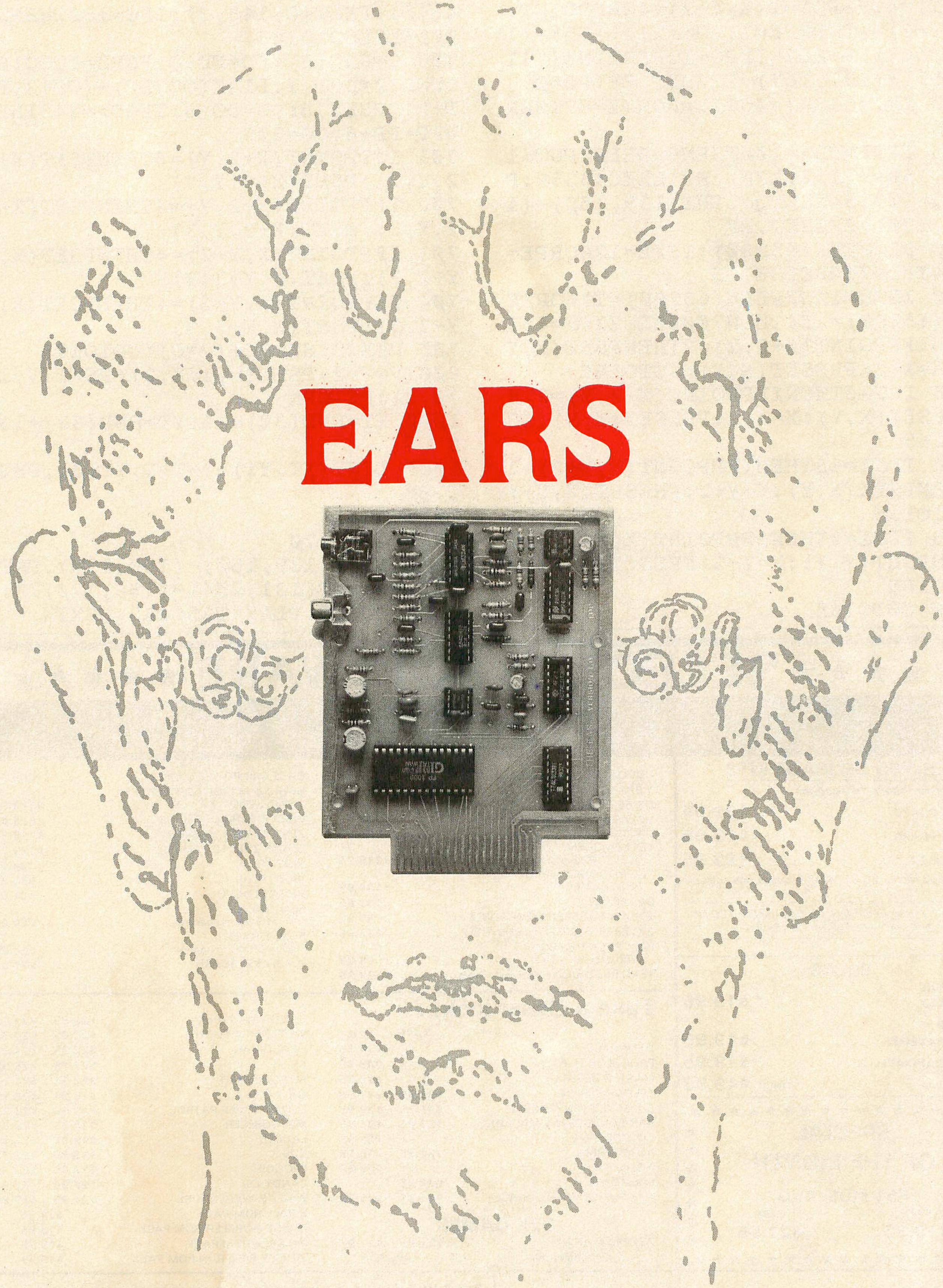
INFORMATION 612-757-1026 (11 A.M. - 2 P.M. C.S.T.)
SAME DAY SHIPPING BEFORE 2 P.M. C.S.T.

EARS



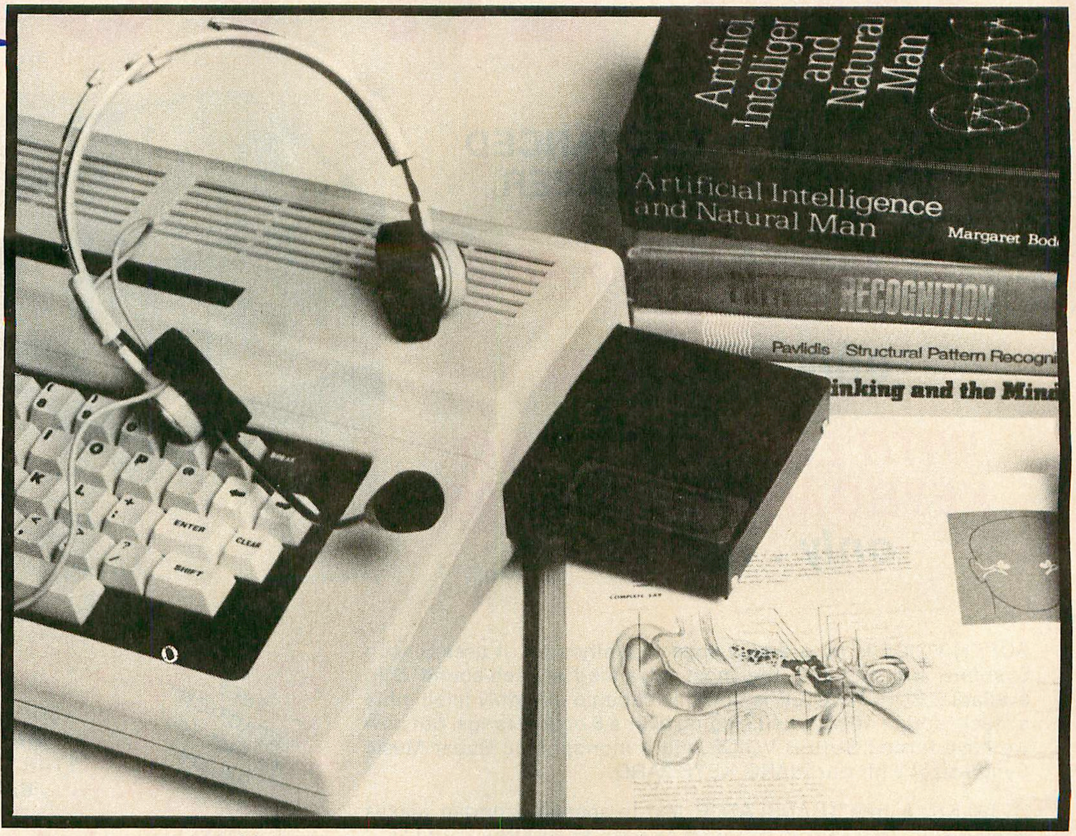
Electronic Audio Recognition System

Now Your Computer Can Listen To You!

EARS™

Electronic
Audio
Recognition
System

$99.95


Artificial Intelligence and Natural Man
Artificial Intelligence and Natural Man
Margaret Bod
RECOGNITION
Pavlidis Structural Pattern Recogni
inking and the Mind
ENTER
CLEAR
SHIFT
BREAK

- SPEECH RECOGNITION
- HANDS OFF PROGRAMMING
- HIGH QUALITY SPEECH REPRODUCTION

EARS Does It All!

INCREDIBLE!

Two Years In the Making. Speech Systems was formed to develop new and innovative speech products. After 2 years of intensive Research and Development, we have created a truely sophisticated speech recognition device. Recognition rates from 95% to 98% are typical. Until now, such a product was outside the price range of the personnel computer market, and even small businesses.

EARS is trained by your voice and capable of recognizing any word or phrase. Training EARS to your particular voice print takes seconds. Up to 64 voice prints may be loaded into memory. You may then save on tape or disk as many as you like so that your total vocabulary is virtually infinite.

Speech and Sound Recognition. EARS is really a sound recognition system, so it really doesn't matter whether you speak in English, Spanish, or French. In fact you do not have to speak at all, you can train EARS to understand sounds such as a musical note or a door slamming.

Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that you would normally do through a keyboard can now be done by just speaking.

Programming EARS Is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN: MATCH will instruct EARS to listen to you and return the matching phrase.

It Talks. EARS is also capable of high quality speech. We mean REALLY high quality. The speech is a fixed vocabulary spoken by a professional announcer. Speech Systems is currently creating a library of thousands of high quality words and phrases. For a demonstration call **(312) 879-6844**, you won't believe your ears or our EARS.

DISK OWNERS. EARS will work with any disk system with either a MULTI-PAK or Y-CABLE. Our new Triple Y-CABLE was specifically developed for those wishing to add SUPER VOICE as a third device.

You Get Everything You Need. You get everything you need including a specially designed professional headset style noise cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

SUPER VOICE $20 OFF

Imagine talking to your computer and it talking back to you. When you need an unlimited vocabulary, you can't beat SUPER VOICE. For a limited time, we will give you the SUPER VOICE for $59.95 with your EARS purchase. Even if you already have another speech unit, here is your chance to buy the best and save $20.

VOICE CONTROL

Applications for EARS are astounding. Here is our first of many listening programs to come. VOICE CONTROL is a program specifically designed to allow you to control any appliance in your house with your voice and our HOME COMMANDER (sold separately). For example, you can control your TV by saying "TV ON" or TV OFF". $24.95

FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA® MasterCard

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Shipping and handling outside the US and Canada	$5.00
COD charge	$2.00

Illinois residents add 6¼% sales tax

Speech Systems

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'SUPER VOICE' T.M.

COCO'S MOST ADVANCED SPEECH SYNTHESIZER.

IT TALKS, SINGS AND MORE.

only . . . $79.95

WITH EARS OR PIANO KEYBOARD PURCHASE

only . . . $59.95

musical applications
of microprocessors

SUPER VOICE is no ordinary speech synthesizer. It uses Silicon Systems, Inc. SSI-263, the most advanced speech/sound chip available. SUPER VOICE is not only capable of highly intelligible speech, sound effects, and singing over a 6 octave range, but now we have turned SUPER VOICE into a monophonic Super Music Synthesizer with our PIANO KEYBOARD.

IT TALKS. A free TRANSLATOR text-to-speech program makes writing your own talking program as easy as SAYING "HELLO."

SUPER VOICE works in any 32K or 64K computer. A disk system requires a Y-Cable or Multi-Pak.

Here are the facts; the decision is yours.

	SUPER VOICE	REAL TALKER	RS SPEECH CARTRIDGE	VOICE-PAK
Synthesizer Device	SSI-263	SC-01	SP-256	SC-01
Speaking Speeds	16	1	1	1
Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
Basic unit of Speech	64 phonemes 4 durations each	64 phonemes	64 allophones 5 pause lengths	64 phonemes
Pitch Variations	4096 (32 absolute levels with 8 inflection speeds)	4	1	4

FREE "REACTION" To Test Your Reflexes

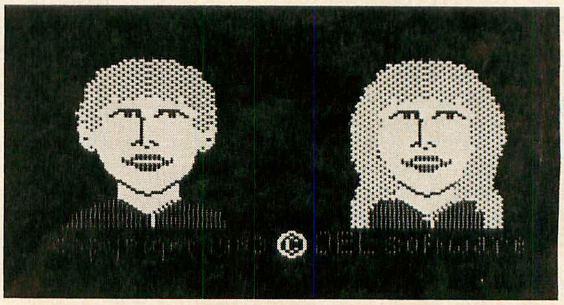
FREE SUPER VOICE SINGS THE STAR SPANGLED BANNER

FREE "SIMON" To Test Your Memory

FOOL'S CROSSING

The world's first TALKING HI-RES GRAPHICS adventure. Finding the hidden treasure is the easy part, getting back home is another story. FREE EARS to the first one to submit a solution.

32K Disk **$24.95**



SUPER TALKING HEADS

When the SUPER VOICE speaks in a low pitched voice, the man speaks, when a high pitched voice is used the woman speaks. **$24.95**

♫ ♫ THE PIANO KEYBOARD ♫

FOR SUPER VOICE and MUSICA 2

A 2½ octave (32 note) and 4 octave (49 note) professional Piano Keyboard connects to your COCO and SUPER VOICE to turn SUPER VOICE into a real music synthesizer. These keyboards are not toys. They are the same style, shape, size and feel as professional synthesizer keyboards. Included is the software to give MUSICA 2 (sold separately) Piano Keyboard input and SUPER SYNTH, a program that allows you to control critical SUPER VOICE parameters to develop incredible sounds.

Disk system will require a Triple Y-Cable or a Multi-Pak. We have lots more plans for these keyboards, so keep watching our ads.

2½ octave (32 note) . . . . **$79.95** 4 octave (49 note) **$119.95**

'HOME COMMANDER'

$59.95

VOICE CONTROL
APPLIANCES
WITH EARS

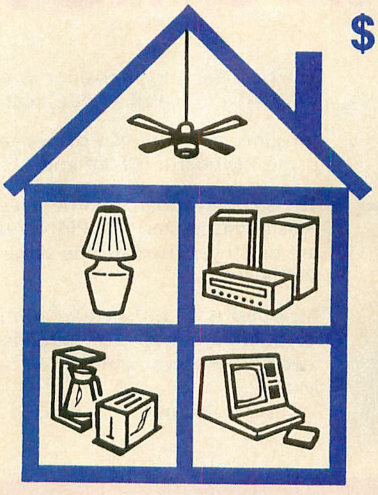
The HOME COMMANDER easily connects to the cassette port of your Color Computer and lets you control appliances in your home.

NO WIRES NECESSARY

The HOME COMMANDER uses your home's existing electrical wiring to control virtually anything. Appliances are controlled via small control modules available at your local SEARS or Radio Shack store.

ON FRIDAY 7:42 PM, OFF SUNDAY 1:26 AM

Included FREE is a program to allow you to control up to 256 devices and specify the time and date they are to be activated. That's right, the software has its own built in accurate clock.



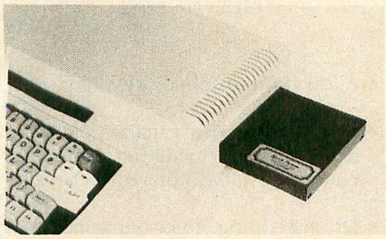
Imagine controlling a light or TV with your voice. When used with our Electronic Audio Recognition System, EARS, you can literally control any appliance.

PLUG'N POWER USERS

If you were disappointed in the software that came with the Radio Shack PLUG'N POWER unit, and you probably were, we'll offer you our powerful software separately. An early version is described in the Feb., April, June, and August 1983 issues of RAINBOW. Our current version is even better. **$19.95**
PLUG'N POWER is a trademark of Radio Shack®

PRECISION TIME MODULE $59.95

— INCLUDES OS9 DRIVER —



Now your computer will always know the correct time and date. This amazing precision time module is calibrated to the National Bureau of Standards (WWV) atomic clock and you should never have to change it.
Use the PRECISION TIME MODULE to add the time element to your games or use on BBS. If you like, purchase separately our BBS.
COLORAMA BBS (64 K, 1 drive minimum) **$99.95**

BATTERY BACKUP

Even when your computer is off, the clock keeps correct time by operating using the internal battery backup system.

THE TIMEPIECE FOR THE COLORAMA BBS

FREE TALKING CLOCK PROGRAM requires VOICE, SUPER VOICE, or SPEECH & SOUND PAK

MONTHS, LEAP YEARS & DST

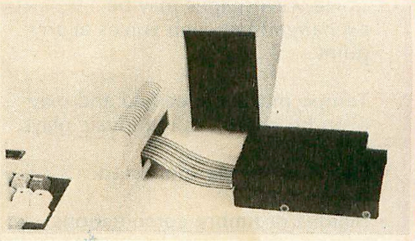
The PRECISON TIME MODULE automatically adjusts for the different number of days in each month as well as leap years. And believe it or not, it adjusts for DST so you don't *have to* remember if it's SPRING FORWARD or FALL FORWARD.

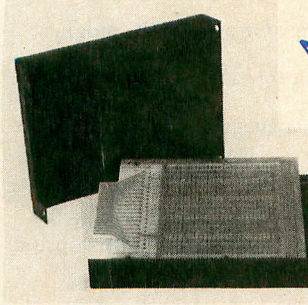
Y-CABLE $28.95

Why pay $100 to $200 for a multi-pak. With the Y-CABLE, you can connect your disk system to your computer along with either our STEREO PAK music synthesizer, our VOICE, SUPER VOICE speech synthesizers, or our PRECISION TIME MODULE. All connectors gold plated.

TRIPLE Y $34.95

We developed the Triple Y-Cable specifically for those interested in both speech synthesis and speech recognition. The Triple Y-Cable lets you connect EARS and SUPER VOICE to your color computer along with your disk system.





NEW! ATTENTION EXPERIMENTERS!

Interested in building your own project? Our oversized board gives plenty of room for construction while the sturdy aluminum case with black satin finish assures protection and a professional appearance.

Prototype Board only **$19.95**
Prototype Enclosure only **$19.95**
Buy both for **$29.95**

Advanced Speech Chip
SSI-263
(SC-02)
$34.95

Need an SC-01? **$29.00**

Disks .... (any quantity)	$1.49
Tape C-10, C-20	$0.69
Hard Tape Box	$0.29
6821	$2.95
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7407	$0.79
IC sockets 14, 16, 22 pin	$0.29
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Shipping and handling outside the US and Canada	$5.00
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1 MEGABYTE COLORAMA **(312) 879-6811 (24 HR. BBS)**
CALL ANY DAY TO ORDER. ALSO ORDER BY MAIL OF BBS.

♫ PIANO KEYBOARD ♫

FOR MUSICA 2 and SUPER VOICE

The best music composition program, MUSICA 2, and most advanced speech/sound synthesizer, SUPER VOICE, just got better.

Imagine, now you can compose music with MUSICA 2 by inputting notes via a *real* piano keyboard. Hit A# and MUSICA 2 instantly displays the note.

The same keyboard can be used with SUPER VOICE to give you a real monophonic music synthesizer. The PIANO KEYBOARD comes in a 2½ and 4 octave version. They are not toys. They are the same style, shape, size, and feel you find in professional synthesizers.

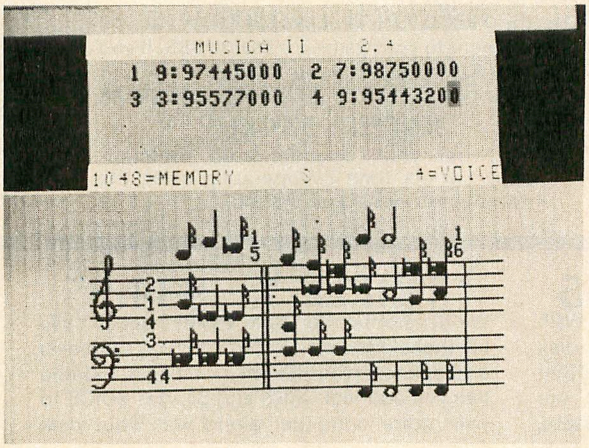
Included is an enhanced command which gives MUSICA 2 (sold separately) piano keyboard input. Also included is SUPER SYNTH, a program which turns SUPER VOICE (see $20 off special offer) into a Super Synthesizer. Disk owners must use a Y-CABLE or Multi-Pak.

2½ octave (32 note) . . . . **$79.95** 4 octave (49 note) **$119.95**

MUSICA 2 $29.95

Tape or Disk

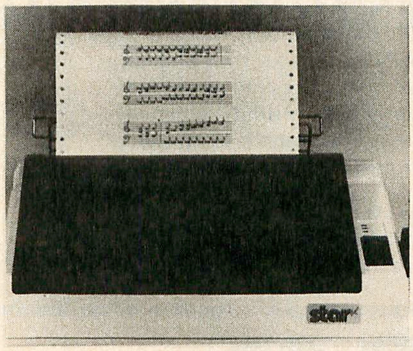
- When in stereo mode, music is played through our STEREO PAK (purchased separately).
- Loudness of each voice may be individually specified.
- Memory available is constantly displayed.
- Voice waveshapes may be exchanged between voices at any point.
- Tempo may be specified and may even be altered as the music plays.
- Flats and sharps supported.
- Billions of timbre combinations.
- High resolution graphic display, looks just like sheet music.
- MUSICA 2 is 100% software, no need for hardware unless you want music produced in STEREO. In that case, the STEREO PAK may be purchased separately. It's a must for the audiophile!
- Repeat bars allow repeating of music without re-inserting music a second or third time.
- 30 page manual describes all.
- Requires minimum of 32K.



```
           MUSICA II     2.4
  1 9:97445000   2 7:98750000
  3 3:95577000   4 9:95443200

1048=MEMORY          3          4=VOICE
```

- Output music to your printer (Gemini 10X, Epson, R.S. printers).



- Allows you to specify key signature.
- Voice timbre (waveshape) may be altered by specifying harmonic content just like stops on an organ.
- During editing, voice being inserted is displayed.
- Each measure is numbered for easy reading of music.
- Measure bars aid in reading and developing music.
- Each voice may be visually highlighted for easy identification.
- 4 Voices produced simultaneously.
- Input notes from Coco keyboard, joystick, or Piano Keyboard.
- Play music from your own BASIC program.
- Block copy music for easy music development.
- 100% machine language so it is lightning fast.
- Vibrato effect easily produced.
- With STEREO PAK, voices may be switched between left and right speakers as music plays.
- Durations include: whole, half, quarter, eighth, sixteenth, thirty-second, sixty-fourth, and triplet.

♫ ♫ MUSIC THEORY ♫ ♫

An advanced music course that covers Major and Harmonic Minor scales, interval spelling, Triad (Chord) theory, Inversions, Dominant 7th chords, and interval ear training. Format of the course includes drill and practice sessions, a scorecard to measure progress, graphics and sound output, and a reviewing session.

32K Disk only **$49.95**

NEW! STEREO PAK™ $39.95

Plug this gem into your computer, connect to your nome stereo system and sit back and enjoy music realism. The STEREO PAK is a hardware music synthesizer that plays our MUSIC LIBRARY and MUSICA 2 music in stereo. Because it was designed specifically with music reproduction in mind, the sound is superb. The highs are crisp and clear while the bass notes will rattle your walls.

The STEREO PAK is all hardware. It is intended as an enhancement for MUSICA 2 and our MUSIC LIBRARY. Disk owners may use the STEREO PAK with the R.S. Multi-Pak or our Y-CABLE ($28.95)

New! NOW "PLAY" AND "SOUND" COMMANDS COME THRU THE STEREO PAK Requires 64K

NEW! MUSIC LIBRARY™ — 3 VOLUMES

10 HOURS OF MUSIC

BUY 2 GET 3rd FREE

You get over 100 four voice songs with a combined playing time of 3 hours. That's right, 3 hours of music. You won't belive your CoCo could sound so good. To fit over 100 songs required both sides of 5 C-20 tapes and the disk version uses 5 full disks (that's a half box of disks).

A JUKE BOX selection program is included to allow you to select specific songs or automatically play each. These songs are ready to go, you don't need MUSICA 2 or a knowledge of music.

These songs were developed using the best music program available for the CoCo; MUSICA 2. The tunes may be used as source files for MUSICA 2 and changed by the user. When coupled with the STEREO PAK the songs are reproduced in stereo with unsurpassed realism.

MUSIC LIBRARY 100 categories:

Stage, Screen, and TV	Classical
Music of the 70's	Christmas (popular)
Music of the 60's	Christmas (traditional)
Music of the 50's	Patriotic
Old Time Favorites	Polka Party

MUSIC LIBRARY 200

Our second volume of 100 tunes, 3½ hours of music.

MUSIC LIBRARY 300

Our third volume of 100 tunes, 3 more hours of music.

MUSIC LIBRARY (Each Volume) . .	(32K Tape) . . .	**$34.95**
(Specify 100, 200, or 300)	(32K Disk)	**$39.95**

SPEECH SYSTEMS DATAPEN $29.95

Two programs are provided free with each DATAPEN. SKETCH is a superb high resolution color drawing program allowing precise drawing and freehand sketching, painting and much more. SHAPE CREATE is a high resolution library shape drawing program. You can even save your work to tape or disk for later display or editing.

The software is shipped on tape and may easily be moved to disk. Included is complete documentation to allow you to integrate the DATAPEN into your own BASIC program.

Requires 32K.

$5.00 OFF With Any Educational Software Program

EASY TO USE!

EDUCATIONAL SOFTWARE

An easy and fun way for kids to enter answers.

Vol. 1 — grades 1, 2, and special education.

Includes these five programs:
- Basic Addition
- Basic Multiplication
- Match the Shapes
- Match the Numbers
- Rhyme the Words

32K disk **$29.95**

Vol. 2 — grades 3 to 6 and special education

Includes these five programs:
- Men of Science
- Mixed Math
- World Capitals
- Computer Terms
- 20th Century Events

32K disk **$29.95**

FREE BLANK DISK OR TAPE WITH EVERY ORDER

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Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
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Speech Systems

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1 MEGABYTE COLORAMA **(312) 879-6811 (24 HR. BBS)**

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```
5001 CLS4:PRINT@102,"may"C$"you"
C$"rest"C$"in"C$"peace";
5002 FORE=128TO480STEP32:PRINT@E
,STRING$(31," ");:NEXT
5003 PRINT@224,"YOU FREED "FD" P
EOPLE ...";
5004 PRINT@320,"AND KILLED "XI"
IMPERIALS ...";
5005 PRINT@384,"FOR A TOTAL SCOR
E OF "SC;
5006 IFINKEY$=""THEN5006
5007 GOTO121
6000 INPUTX,Y:PSET(X,Y,1):SCREEN
1,0:FORX=1TO200:NEXTX:GOTO6000
6999 RH=1
7000 IFRH=0ANDPC=0THEN155ELSEIFP
C=1THEN700ELSEIFRH=1THEN FOR C=1
82 TO220:PSET(C,146,4):PSET(C,14
8,4):PLAYSTR$(INT((224-C)/4)):NE
XTC:S=20:C=222
7005 FORV=174TO220:PSET(V,168,4)
:PSET(V,170,4):PLAYSTR$(INT((224
-V)/4)):NEXTV:V=222
7010 IFPPOINT(X+2,Y)=1THENPSET(X
+2,Y,3):PSET(X+3,Y,3)
7015 IFPPOINT(X-2,Y)=1THENPSET(X
-2,Y,3):PSET(X-3,Y,3)
7020 IFPPOINT(X,Y+2)=1THENPSET(X
,Y+2,3):PSET(X,Y+3,3)
7025 IFPPOINT(X,Y-2)=1THENPSET(X
,Y-2,3):PSET(X,Y-3,3)
7030 GOTO155
8000 EX=RND(19)+15:EY=RND(16)+14
3
8005 LINE(70,137)-(129,170),PRES
ET,BF
8010 COLOR4,3:LINE(EX+2,EY+1)-(E
X,EY+5),PSET,BF:COLOR2,3:J=JOYST
K(0):J1=JOYSTK(1)
8011 IFJ<6THENJ=6
8012 IFJ1<6THENJ1=6
8015 J=INT(J/6):WX=(J*4)+6:J1=IN
T(J1/6):WY=(J1*4)+134
8020 PSET(WX,137,4):PSET(9,WY,4)
8025 Q=PEEK(65280):IFQ=126ORQ=25
4THENPK=PPOINT(WX,WY):IFV<176THE
N8050ELSEGOSUB800:LINE(WX,137)-(
WX,WY),PSET:LINE(134,157)-(73,15
7),PSET:LINE(9,WY)-(WX,WY),PSET:
PLAY"ABABABAB":IFPK=4THEN8030ELS
ELINE(WX,137)-(WX,WY),PRESET:LIN
E(9,WY)-(WX,WY),PRESET
8026 LINE(73,157)-(134,157),PRES
ET:GOTO8050
8027 GOTO8050
8030 XI=XI+1:COLOR4,3:LINE(EX-4,
```

128K THE EASY WAY

AS SEEN IN DECEMBER '84 RAINBOW

'D', 'E', 'F', & CoCo II (USA)

LOGIC BOARD **$39.95**

Logic Board with 64K Socketed Ram

$109.00

128K Newletter........ (per year) **10.00**
Star Dos 128K................ **59.95**
Procolor File.................. **59.95**
128K Drive 3. .... **24.95**

DEALER ORDERS WELCOME
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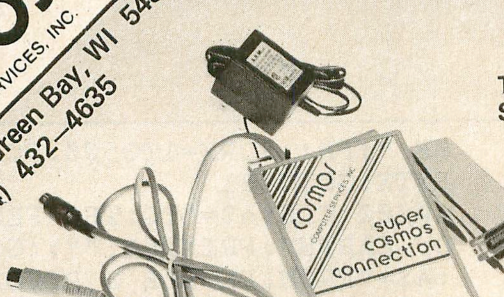
```
EY)-(EX+10,EY+10),PSET,BF:COLOR2
,3:FORQ=30TO100STEP5:PLAY"T"+STR
$(Q)+"AB":NEXTQ:LINE(EX-4,EY)-(E
X+10,EY+10),PRESET,BF:SC=SC+300:
LINE(WX,137)-(WX,WY),PRESET:LINE
(9,WY)-(WX,WY),PRESET:PSET(WX,13
7,1):PSET(9,WY,1)
8031 LINE(73,157)-(134,157),PRES
ET:GOTO155
8050 PSET(WX,137,1):PSET(9,WY,1)
:IFRND(16)<=(LQ-2) THEN8060ELSE8
010
8060 IO=IO+1:IFIO=4THENIO=0:LINE
(EX-4,EY)-(EX+10,EY+10),PRESET,B
F:GOTO155ELSEZZ=1:Q=70:PSET(EX+2
,EY+3,4):PLAY"ABABCDCD":PSET(EX+
2,EY+3,1):IFRND(2)=1THEN9000
8065 Q=Q+ZZ:ZZ=ZZ+LQ
8066 EXEC43359
8067 J=JOYSTK(0):J1=JOYSTK(1)
8070 IFPPOINT(146,150)=2ANDQ>=14
6THEN5000ELSEPSET(Q,150,4):DV=PE
EK(65280):IF(DV=126ORDV=254)ANDJ
1=63THENPUT(139,157)-(150,170),D
:LINE(139,150)-(150,155),PRESET,
BF ELSEPUT(139,150)-(150,170),R1
8075 IFQ<=149THEN8065
8080 LINE(71,150)-(150,150),PRES
ET:PLAY"CDCDABAB":LINE(139,150)-
(150,170),PRESET,BF:PUT(139,150)
-(150,170),R1:LINE(156,151)-(162
,151),PRESET:LINE(167,151)-(180,
151),PRESET:GOTO8050
9000 Q=Q+ZZ:ZZ=ZZ+LQ
9001 EXEC43359
9005 J=JOYSTK(0):J1=JOYSTK(1)
9010 IFPPOINT(146,166)=2ANDQ>=14
6THEN5000ELSEPSET(Q,166,4):DV=PE
EK(65280):IF(DV=126ORDV=254)ANDJ
1=0THENPUT(139,150)-(150,165),J:
LINE(139,167)-(150,170),PRESET,B
F ELSEPUT(139,150)-(150,170),R1
9020 IFQ<=149THEN9000
9030 LINE(71,166)-(150,166),PRES
ET:PLAY"CDCDABAB":LINE(139,150)-
(150,170),PRESET,BF:PUT(139,150)
-(150,170),R1:LINE(156,167)-(162
,167),PRESET:LINE(167,167)-(180,
167),PRESET:GOTO8050
10000 CLS0
10001 PRINT@136,"";
10002 POKE140,245
10005 A$="operation":GOSUB10030
10010 A$="freedom"
10015 POKE1169,58:EXEC43359
10016 PRINT@146,"";
```



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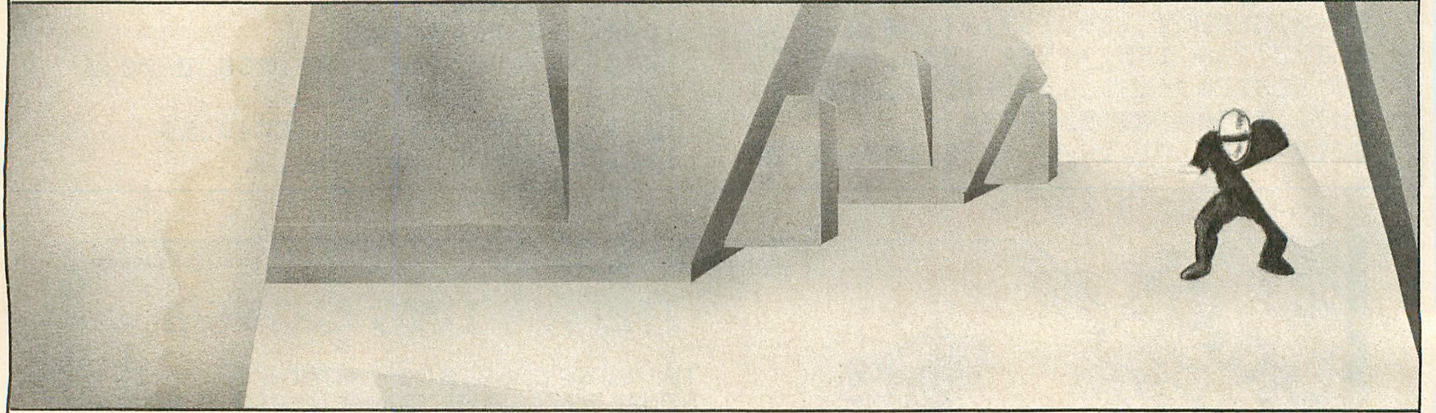
```
10020 GOSUB10030
10021 FORX=1TO100:NEXTX:POKE1198
,45:EXEC43359:PRINT@175,"";:A$="
by":GOSUB10030
10022 POKE1201,45:EXEC43359:PRIN
T@202,"";:A$="steve":GOSUB10030
10023 PRINT@208,"";:A$="britton"
:GOSUB10030
10025 FORX=1TO800:NEXTX:GOTO1
10030 FORX=1TOLEN(A$)
10031 POKE140,150
10035 B$=MID$(A$,X,1):PRINTB$;:E
XEC43359:FORZ=1TO RND(50):NEXTZ:
NEXTX
10040 RETURN
10045 NEXTKQ
10050 DRAW"BM88,4D7U3R4U4D7BM94,
8D3F1R3BM95,8R2D2L2BM100,6D6BM10
3,8D7U5R2E1U1H1L2BM116,4D4BM116,
11M116,11BM120,4D4BM120,11M120,1
1BM123,4D4BM123,11M123,11"
10060 FORKQ=1TO200:NEXTKQ:LINE(8
```



```
8,4)-(123,15),PRESET,BF
10070 GOTO10020
20000 C$=CHR$(128):PMODE1,1:PCLS
3:SCREEN1,0:COLOR2,3:DRAW"BM0,12
0C4R4L2M8,99R66M80,120R2L4BM75,9
9E8U12H8L66G8D12F8":PAINT(36,88)
,4,4:PSET(20,180,2):DRAW"BM16,18
3C2F2R4E2M20,187G2D2BM23,190U2":
GET(16,180)-(24,190),IK:LINE(16,
-(40,99),PRESET,BF:NEXTX
180)-(24,190),PRESET,BF
20010 FORJZ=1TO10:PRESET(RND(80)
,RND(25)+71):NEXTJZ
20020 FORX=1TOINT(FD/5)
20025 FORZ=250TO40STEP-20
20030 GET(Z,111)-(Z+10,120),IS:P
UT(Z,111)-(Z+10,120),IK:EXEC4335
9:FORA=1TO50:NEXTA:PUT(Z,111)-(Z
+10,120),IS
20040 NEXTZ:PUT(40,111)-(50,120)
,IK:LINE(40,99)-(50,120),PSET,BF
:FORT=50TO100STEP10:PLAY"T"+STR$
(T)+"ABABABA":NEXTT:LINE(50,120)
```

```
20050 DRAW"BM40,100C2D2R6U2L4D6R
2U4C4BM39,100D6R2U2BM44,108L2D2R
2BM48,100D6L2U2":GET(0,71)-(83,1
20),ZT
20060 PLAY"O1T1;4;6;5;1;T1;3"
20070 FORY=71TO0STEP-1:PCLS3:W=W
+2:PUT(0,Y)-(83,Y+49),ZT:PLAY"T"
+STR$(W)+"O2ABCD":NEXTY
20080 CLS0:PRINT"you"C$"have"C$"
escaped";:POKE1024+17,33:POKE102
4+18,33
20090 FORE=128TO480STEP32:PRINT@
E,STRING$(31," ");:NEXT
20095 SC=SC+1000
30000 PRINT@224,"YOU FREED "FD"
PEOPLE ...";
30010 PRINT@320,"AND KILLED "XI"
 IMPERIALS ...";
30020 PRINT@384,"FOR A TOTAL SCO
RE OF "SC;
30030 IFINKEY$=""THEN30030
30031 PH=PH+1:CLS0:PRINT@45,"PHA
SE ";PH;:FORX=1TO500:SCREEN0,1:N
EXTX:GOTO121
40000 CLS:A$="TO:THE FEDERATION
OF EARTH":PRINT@0,"";:GOSUB10030
:A$="FROM:PEOPLE'S REVOLUTION FO
R":PRINT@64,"";:GOSUB10030:A$="A
NARCHY":PRINT@96,"";:GOSUB10030:
A$="DATELINE:LUNA ALPHA":PRINT@1
35,"";:GOSUB10030
40009 FORX=1TO200:NEXTX
40010 A$="WE HAVE TAKEN LUNA ALP
HA":PRINT@192,"";:GOSUB10030:PRI
NT@218,"-STOP-";:SOUND200,1
40014 FORX=1TO100:NEXTX
40015 A$="WE HAVE PRISONERS":PRI
NT@256,"";:GOSUB10030:PRINT@282,
"-STOP-":SOUND200,1
40019 FORX=1TO100:NEXTX
40020 A$="THEY START DYING IN 8
HRS.":PRINT@320,"";:GOSUB10030:P
RINT@346,"-END-":SOUND200,1
40030 FORX=1TO500:NEXTX:GOTO1000
0
```

DISK UTILITY

16K Disk

Say 'Hello' To This Directory Helper

By Doug Heyza

"Stop! Slow down! I want to get on!"

Have you been saying those words every time you look at your diskette's directory? Well, I have a solution. *Hello* will help those of us who would like to see the directory before it scrolls down the screen.

From the program you can LOAD, RUN, KILL and RENAME programs with a section of the directory to look on. The program has a total of three pages available and 26 program names possible per page. *Hello* will list the programs you have on the pages, starting from the first page.

After you type in the program, make sure you save it. When you load or run a program from *Hello* it will be replaced with the program you select. A good thing to do is save this program on your most-used diskettes; it will save time in changing diskettes.

Instructions

When you run *Hello*, the program will ask for a drive number. Press the appropriate drive number from which you want the directory listed (0, 1, 2 or 3). The program will then assign the programs on the disk with a letter and display them on the screen. These letters are used instead of typing in the whole program name:

R=Run
L=Load
N=Rename
K=Kill
P=Page
E=End program
↑=Rerun program

To use a function, press the letter of the function you want, which is outlined in black at the bottom of the screen. When using the functions Load and Run the program asks for a letter; press the corresponding letter to the program you want.

Pressing 'R' (Run) will LOAD a BASIC program and RUN it. If the program is in machine language it will be LOADed and EXECed. If the BASIC program needs a CLEAR or a PCLEAR before being RUN, don't use this option. Or, if a machine language program needs an EXECing address, don't use this option; you may be able to use the next option.

Pressing 'L' (Load) will basically do the same thing as Run except it only LOADs the program and does not RUN or EXEC it.

Pressing 'N' (Rename) will ask for the letter assigned to the program you would like to change, then there will be a space for the new name to be entered. Enter the name only in the blue space (first eight characters), then enter the extension in the red space (last three characters). It will then ask, "CORRECT (YES/NO)?" You must type YES and press the ENTER key. Inputting anything else will take you to the main menu. After YES is entered it will RENAME the program you selected and relist the directory from Page 1.

By pressing 'K' (Kill), you will be asked to press the letter of the program you want to kill. After the appropriate letter is pressed it will ask, "CORRECT (YES/NO)?" You must, again, type YES. It will kill the program and relist the directory.

Pressing 'P' (Page) will take you to the next page of the directory. If you are on the last page it will return to Page 1. It will also tell you what page you are on and the total number of pages.

(Doug Heyza is 15 years old and attends Stevenson High School in Livonia, Michigan. He is interested in computers and electronics and plans to have a computer-oriented career.)

Pressing 'E' (End Program), will exit you from the program, but will not clear it from memory.

Pressing the up-arrow key will rerun the *Hello* program. You can use this if the program you want isn't on the diskette you selected. First, change the diskette when you're at the main menu and while the disk light is off, press the up-arrow key. The new diskette's directory will be listed after you enter the drive number.

If you press the wrong function, and it is asking for a letter, pressing the CLEAR key will take you back to the main menu.

How it Works

Hello checks Track 17 on the drive you select, which contains the names of the programs on that disk. It uses the DSKI$ command. It will check from sectors 3-11. Bytes 0-7 contain the name. If byte 0 is zero, then the name has been deleted and the program skips it. If byte 0 is "FF" (hexadecimal), then there are no more program names and the program goes to the next procedure.

The extensions are in bytes 8-10 and the last thing it looks for is the file type (example: BASIC, data). That resides in byte 11. If it is a BASIC program, byte 11 would be zero. BASIC data files are one. Machine languages are two and text editor sources are three. If it isn't zero or two, it doesn't allow you to load it. (You can find out more in your "Disk Systems" book.)

It will then proceed to print the directory with a corresponding letter, one for each program on that page. From there it goes to the main menu subroutine and waits for a key (using the INKEY$ statement) and goes to the proper subroutines. It uses the regular commands to LOAD, RENAME and KILL. To RUN it uses LOAD"program name",R.

For machine language programs it uses LOADM and LOADM followed by an EXEC command. The flashing cursor is produced by a colored square being printed before the INKEY$ and a CHR$(9), backspace, after it checks to see if there is an INKEY$. Otherwise, it branches to the subroutine selected.

Variables

DN — Drive number
I$ — INKEY$ inputs
T$ — Program name
E$ — Extension name
P$ — Program name and extension
F — File type
PG — Number of pages
PL — Number of program on last page
P — Page presently on
ST — Number of programs per column
PN — Program number
LP — Program number from input
R$ — New name input from rename

Changes that Can be Made

If you have only one drive you can put REMarks before lines 40-100 to keep from entering the drive number every time you run the program.

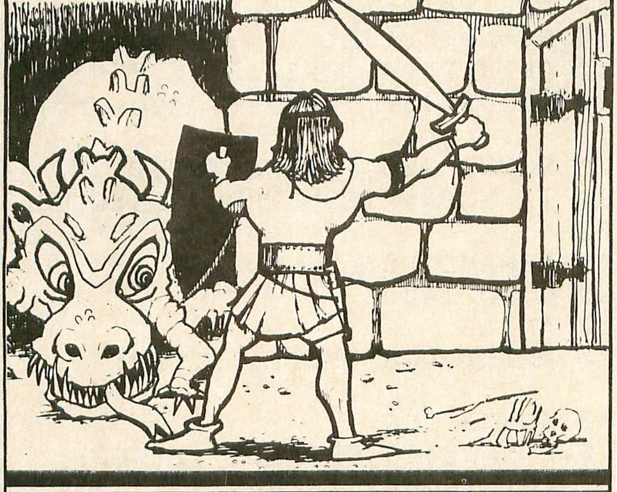
If you don't receive RAINBOW ON TAPE and don't want to type this program in, send me $3 for postage and handling. I'll send you a cassette copy. My address is 36145 Jay, Livonia, MI 48152.

240 128
470 59
640 213
850 160
END 70

The listing: HELLO

```
10 'HELLO        BY DOUG HEYZA
20 CLEAR 2000
30 'SELECT DRIVE NUMBER
40 CLS
50 SOUND 200,1:PRINT"DRIVE # :"
60 PRINT"(0,1,2 OR 3)"
70 PRINT@10,CHR$(191);:I$=INKEY$
:IF I$="" THEN PRINT CHR$(8);:GO
TO 70
80 IF I$<"0" OR I$>"3" THEN 70
90 DN=VAL(I$)
100 PRINT@10,DN;
110 DRIVE DN
120 DIM A$(69),N(69),T$(69),E$(6
9),P$(69),F(69)
130 'READ DIRECTORY
140 N=0:P=0:FOR X=3 TO 11
150 DSKI$ DN,17,X,A$(1),A$(2)
160 FOR Q=1 TO 2
170 FOR I=1 TO 128 STEP 32
180 N=N+1
190 T$(N)=MID$(A$(Q),I,8)
200 IF ASC(T$(N))=255 THEN N=N-1
:GOTO270
210 IF ASC(T$(N))=0 THEN N=N-1:G
OTO250
220 E$(N)=MID$(A$(Q),I+8,3)
230 P$(N)=T$(N)+"."+E$(N)
240 F(N)=ASC(MID$(A$(Q),I+11,1))
250 NEXT I,Q,X
260 'PRINT FILES
270 PG=INT(N/26+.97)
280 PL=INT(((N-(PG-1)*26)/2)+.5)
290 P=P+1
300 CLS
310 IF P=PG THEN ST=PL ELSE ST=1
3
320 FOR PN=1 TO ST
330 PRINT CHR$(PN+96);" ";P$(PN+
((P-1)*26)),
340 IF P$(PN+ST+((P-1)*26))="" T
HEN 360
350 PRINT CHR$(PN+ST+96);" ";P$(
PN+ST+((P-1)*26))
360 NEXT PN
370 'MAIN MENU
380 SOUND 200,1:PRINT@448,"  rUN
  lOAD  REnAME  kILL  eND";
390 PRINT@480,"FUNCTION:    ";CH
R$(126);"RUN  pAGE";P;"OF";PG;
400 PRINT@490,CHR$(175);:I$=INKE
Y$:IF I$="" THEN PRINT CHR$(8);:
GOTO 400
410 IF I$="R" THEN 500
420 IF I$="L" THEN 580
430 IF I$="N" THEN 660
```

Denna



MEDIEVAL ADVENTURE

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After capturing the Castle of Denna, you and your trusted followers are given to wine and song and celebration. So much celebration that you deplete the overthrown king's ale and must rummage the castle for more. You soon discover a small strongbox covered with strange, indecipherable writings. You bring it back to your comrades where you discover inside a rusted metal staff on which similar writings are recorded. Convinced it is a powerful magic wand, you become the focus of jokes and chiding. One of your friends playfully touches the staff to your shoulder while scoffing at your belief in magic. Their boisterous laughter is quickly replaced with open-mouthed astonishment as you vanish in a blinding flash of light. You find yourself in a dark, damp and stinking dungeon deep within the bowels of the castle. Armed with nothing more than your good sense and survival skills, you must avoid being killed by the many monsters and pitfalls inhabiting these depths. You must ESCAPE FROM DENNA.

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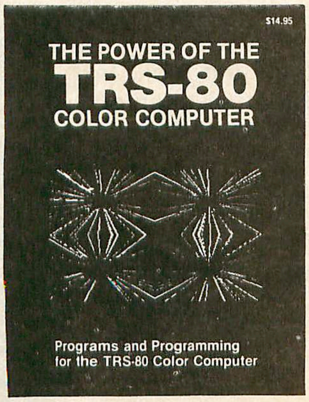

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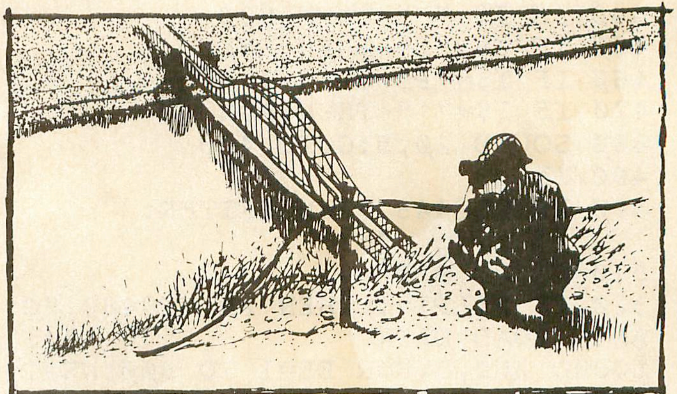

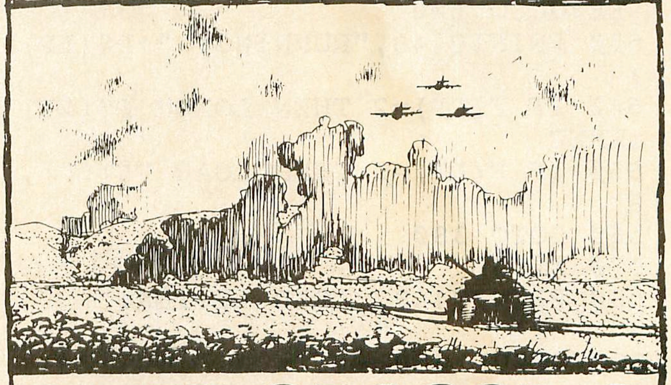

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```
440 IF I$="K" THEN 820
450 IF I$="E" THEN END
460 IF I$="P" THEN 920
470 IF I$="^" THEN RUN
480 SOUND 20,5:GOTO 400
490 'RUN
500 PRINT@448,"RUN LETTER:
          ";
510 GOSUB 950
520 IF F(LP)=1 THEN PRINT@480,"C
AN'T LOAD DATA              ";:
SOUND 200,5:FOR EE=1 TO 500:NEXT
 EE:GOTO 500
530 PRINT@448,"RUNNING: ";P$(LP)
;
540 IF F(LP)=2 THEN LOADM P$(LP)
:EXEC
550 IF F(LP)=0 THEN LOAD P$(LP),
R
560 GOTO 380
570 'LOAD
580 PRINT@448,"LOAD LETTER:
          ";
590 GOSUB 950
600 IF F(LP)=1 THEN PRINT@480,"C
AN'T LOAD DATA              ";:
SOUND 20,5:FOR EE=1 TO 500:NEXT
EE:GOTO 500
610 PRINT@448,"LOADING: ";P$(LP)
;
620 IF F(LP)=2 THEN LOADM P$(LP)
:END
630 IF F(LP)=0 THEN LOAD P$(LP):
END
640 GOTO 380
650 'RENAME
660 PRINT@448,"RENAME LETTER:
          ";
670 GOSUB 950
680 PRINT@448,P$(LP);" TO ";STRI
NG$(8,175);".";STRING$(3,191);
690 PRINT@464,;:SOUND 200,1:LINE
INPUT N$
700 IF LEN(N$)>8 THEN 680
710 PRINT@472,".";STRING$(3,191)
;
720 PRINT@473,;:SOUND 200,1:LINE
 INPUT E$
730 IF LEN(E$)>3 THEN 710
740 R$=N$+"."+E$
750 PRINT@480,STRING$(31," ");
760 PRINT@480,"CORRECT (yes/no)?
";
770 SOUND 200,1:LINE INPUT YN$
780 IF YN$<>"YES" THEN CLS:GOTO
300
790 RENAME P$(LP) TO R$
800 GOTO 140
810 'KILL
820 PRINT@448,"KILL LETTER:
          ";
830 GOSUB 950
840 PRINT@448,"KILL: ";P$(LP);
850 PRINT@480,STRING$(31," ");
860 PRINT@480,"CORRECT (yes/no)?
";
870 SOUND 200,1:LINE INPUT YN$
880 IF YN$<>"YES" THEN CLS:GOTO
300
890 KILL P$(LP)
900 GOTO 140
910 'PAGE
920 IF P=PG THEN P=0
930 GOTO 290
940 'INPUT LETTERS
950 SOUND 200,1:PRINT@480,"[clea
r] TO EXIT TO MENU          ";
960 PRINT@463,CHR$(255);:I$=INKE
Y$:IF I$="" THEN PRINT CHR$(8);:
GOTO 960
970 IF I$=CHR$(12) THEN 380
980 LP=(ASC(I$)-64)+((P-1)*26)
990 IF P$(LP)="" THEN SOUND 20,5
: GOTO 960
1000 PRINT@480,STRING$(31," ");
1010 RETURN
```

Corporation Plus is a fast paced arcade styled game combining skill, strategy and luck. In the course of the game, players may buy and sell corporations, invest in the stock market, buy lottery tickets, lose or gain capital in situations on the board or go bankrupt.

One to Seven players can play or players may compete against the computer.

Requires 32K Extended Basic

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RAINBOW
CERTIFICATION SEAL

64K
ECB

Around The World In 18 Frames

By Bob, Daniel and Tino Delbourgo

It is quite common to get a view of the rotating Earth at the start of a news program. This is easy to arrange through cinefilm or on mainframe computers with powerful graphics, but represents a real challenge on small microcomputers with their limited memories. We offer you a program for our favorite 64K machine which just manages such a graphics feat. (You can, of course, adapt it to other circumstances.)

(Bob, Daniel and Tino Delbourgo are a father/sons programming team who have a particular interest in computer graphics. Tino delves into machine language, Daniel handles graphics and Bob provides the mathematical formulae.)

There are two tricks needed to simulate a spinning world: First, one has to devise a way of encapsulating the map of the Earth; second, one must find a way of storing the pictures in the computer — this is where the memory limitation is most acute.

For trick #1, we have broken up the world into 18 lunes (20 degree separations between lines of longitude), marked out the key vertices that needed joining and stored them in strings via `DATA` statements. Then, depending on the orientation of the Earth, we have called them up, done the necessary spherical projection and drawing, and stored the frame on tape or disk. For trick #2, we have managed to release 36 graphics pages in `PMODE2` (a large slice of memory), and after calling up the pictures from tape or disk, stored each frame in two pages.

After that it is a simple matter to flick through them in quick succession and get a perfectly satisfactory representation of the turning world. The eye is easily deceived into thinking the motion is smooth; with fewer pictures this would not have been true.

The program is necessarily divided into two parts. Listing 1, *Earthrot*, takes care of the world map and the successive drawings. When running it, do make sure your tape or disk is ready to store the 18 screens. *Pageturn*, the second listing, contains a machine language injection to release 20 pages in the upper reaches of the 64K.
of the 64K.

In addition, you will need to do some appropriate `POKE`s to release a further 16 pages in the lower 32K — the instructions appear in the program. With all this memory available, loading the screens becomes a cinch (remember to have your disk ready or your tape properly rewound). The final step is the cinematography.

Even if your colleagues have another computer brand, they will be impressed by the versatility of CoCo, so please bring them along to the show!

(The Delbourgos may be reached at 15 Willowdene Ave., Sandy Bay, Hobart, Australia 7005 for any questions you may have concerning these programs.)

110	90
200	38
290	246
360	1
390	217
470	97
END	70

Listing 1: EARTHROT

```
10 CLEAR1700:PI=3.14159265:CLS:PRINT"ROTATING EARTH -- THE DELBOURGOS":PRINT"WAIT A MOMENT FOR THE GEOGRAPHICSTRINGS TO BE READ..."
20 DIMN(20),A$(20):N(1)=45:N(2)=40:N(3)=43:N(4)=20:N(5)=20:N(6)=46:N(7)=69:N(8)=44:N(9)=25:N(10)=15:N(11)=10:N(12)=18:N(13)=17:N(14)=42:N(15)=63:N(16)=27:N(17)=11:N(18)=36
30 FORJ=1TO18:FORI=1TON(J):READLA,LO:A$(J)=A$(J)+CHR$(LA+90)+CHR$(LO):NEXTI,J
40 PRINT:PRINT"WILL YOU SAVE THE PICTURES TO    <T>APE OR <D>ISK?"
50 IN$=INKEY$:IFIN$="T"THENDE=1:GOTO70
60 IFIN$="D"THENDE=2:VERIFYON:GOTO70ELSE50
70 FORJ=18TO1STEP-1
80 PMODE2,1:PCLS1:SCREEN1,0
90 FORK=1TO9:I=J+K-1:IFI>18THENI=I-18
100 LA=ASC(LEFT$(A$(I),1))-90:LO=ASC(MID$(A$(I),2,1))-110+20*K:W=0
110 LO=LO*PI/180:LA=90-LA:LA=LA*PI/180:GOSUB200:X1=X:Y1=Y
120 FORII=3TOLEN(A$(I))STEP2:LA=ASC(MID$(A$(I),II,1))-90:LO=ASC(MID$(A$(I),II+1,1)):W=0:GOSUB210:NEXTII,K
130 CIRCLE(128,96),96,0:CIRCLE(18,18),16:LINE(18,18)-(18+16*COS(J*2*PI/9),18+16*SIN(-J*2*PI/9)),PSET:PAINT(240,190),0,0:PAINT(20,190),0,0
135 IFJ=2*INT(J/2)THENPSET(10,90,1):PSET(30,170,1):PSET(210,6,1):PSET(230,70,1):PSET(235,130,1):PSET(220,180,1):PSET(250,40,1):PSET(10,130,1)
140 IFDE=2THENSAVEM"PAGE"+MID$(STR$(19-J),2),&H0E00,&H19FF,&HB44A
150 IFDE=1THENCSAVEM"PAGE"+MID$(STR$(19-J),2),&H0600,&H11FF,&HB44A:MOTORON:FORTT=1TO1000:NEXTTT:MOTOROFF
160 NEXTJ:PRINT:PRINT"all saved!":END
170 FORF=0TO1:FORK=-3TO4STEPST/2:PMODEM,13-ST:PCLS1:SCREEN1,SC:COLORINT(M/2)
180 FORL=1TO ST:A=USR0((32-ST+L)*256+2*K+6+L+16*F):NEXTL,K,F
190 FORI=1TO33-M STEPST:A=USR1(I):SCREEN1,SC:FORT=1TO20:NEXTT,I:GOTO190
200 Y=95*(1-COS(LA)):X=128+95*(SIN(LA))*(SIN(LO)):X=INT(X):Y=INT(Y):RETURN
210 IFLO>20THENLO=LO-100:W=1
220 LO=LO-110+20*K:LO=LO*PI/180:LA=90-LA:LA=LA*PI/180:GOSUB200
230 IFW=1THENCOLOR1ELSECOLOR0
240 LINE(X,Y)-(X1,Y1),PSET
250 X1=X:Y1=Y:RETURN
260 DATA 78,20,79,16,76,20,78,20,70,120,62,6,60,8,61,11,57,13,59,18,64,17,67,20,54,120,55,11,58,12,57,10,55,10,50,0,40,100,41,2,42,4,43,10,38,17,36,17,37,13,38,17,39,18,44,13,45,15,40,20,32,12
```

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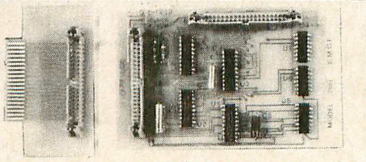
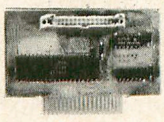

MODEL 200


MODEL 100

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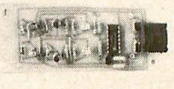
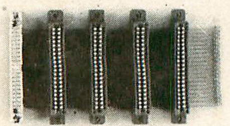

MODEL 500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```
0,29,20,31,10,33,12,32,0,5,100,4
,10,-2,9,-7,13,-20,12
270 DATA -35,18,-35,20,-70,120,-
68,10,-70,0
280 DATA 70,0,71,9,68,20,68,17,6
5,18,66,20,67,100,67,2,65,6,62,5
,61,12,54,0,40,100,36,2,38,4,41,
4,41,7,46,8,45,18,42,20,41,7,37,
8,37,17,32,16,31,10,32,0,20,120,
30,18,28,17,29,15,15,20,0,110,-1
7,120,-20,15,-23,15,-34,8,-35,0,
-70,120,-68,14,-69,0
290 DATA 66,0,69,14,66,20,46,120
,45,16,43,16,42,20,46,20,44,112,
47,9,45,6,38,8,36,12,41,14,43,11
,44,12,40,120,26,120,27,17,28,12
,31,7,24,10,25,16,22,20,17,17,12
,7,20,0,15,100,11,6,12,12,4,8,-4
,0,-17,0,-17,106,-14,10,-20,10,-
25,8,-24,5,-17,6,-20,100
300 DATA -70,100,-65,1,-68,20
310 DATA 66,0,69,0,72,6,71,12,67
,8,69,16,71,15,71,20,10,120,8,18
,16,14,22,12,20,10,25,6,25,0,0,1
20,-68,100,-68,14,-70,15,-67,20
320 DATA 71,0,76,20,5,120,7,18,1
6,17,14,16,22,10,21,8,15,2,10,0,
9,100,7,2,6,0,9,0,4,120,6,16,-2,
20,-67,120,-66,5,-67,0
330 DATA 76,0,75,12,71,4,72,20,4
0,120,38,17,36,20,26,120,22,15,2
1,9,20,11,19,8,21,9,20,6,18,5,13
,7,8,5,13,2,8,0,5,4,1,4,6,0,-2,5
,-4,3,-2,100,-4,3,-9,15,-6,10,-4
,3
340 DATA 1,120,0,18,4,17,5,19,7,
17,2,9,-2,11,-3,16,0,18,-5,20,-2
0,120,-22,16,-36,17,-35,20,-67,1
20,-66,15,-67,0
350 DATA 72,0,68,17,70,20,58,120
,56,18,55,20,46,20,42,13,43,8,40
,7,36,9,35,6,40,5,40,0,36,100,36
,2,34,0,30,2,26,0,40,120,38,19,3
5,10,34,9,36,20,21,101,23,3,22,1
,21,1,6,105,8,7,9,5,13,4,15,2,17
,2,17,1,15,0,13,4,9,2,9,5,7,3,6,
5
360 DATA 1,101,2,5,-1,0,-1,2,-5,
2,-3,0,-5,0,-3,120,-4,16,-1,12,-
3,13,-5,17,-9,20,-17,120,-15,15,
-12,16,-13,10,-16,8,-15,6,-20,0,
-36,120,-33,18,-35,16,-34,11,-35
,0,-67,100,-66,14,-67,20
370 DATA 70,0,68,20,53,120,56,17
,58,20,61,20,58,16,58,0,50,110,3
6,100,39,2,41,1,42,3,44,1,49,3,5
6,1,44,1,41,1,40,1,-3,100,-6,8,-
5,14,-3,12,-5,15,-7,12,-6,8,-10,
10,-9,8,-7,4,-9,0
380 DATA -17,100,-12,2,-25,13,-3
0,14,-36,10,-38,5,-36,0,-42,104,
-41,7,-44,6,-43,4,-42,4,-67,100,
-72,20
390 DATA 68,0,67,20,65,120,63,19
,59,1,53,0,-49,108,-48,11,-42,14
,-38,19,-37,16,-35,14,-37,15,-40
,13,-42,14,-41,11,-46,7,-49,8,-6
0,100,-72,100,-73,14,-80,0,-82,8
,-81,11,-81,20
400 DATA 65,0,65,10,67,0,72,20,7
0,9,67,20,67,9,65,17,62,13,60,20
,58,13,58,20,0,100,-82,100,-81,2
0
410 DATA 72,0,71,20,58,100,59,8,
61,13,60,20,0,110,-76,120,-79,0,
-81,0
420 DATA 73,20,74,12,78,15,79,20
,73,20,72,120,71,0,33,120,41,15,
47,15,50,13,48,15,60,0,0,110,-76
,100,-78,10,-75,11,-74,20
430 DATA 70,20,74,5,70,4,69,10,7
0,20,68,120,67,15,71,0,17,120,20
,13,32,6,23,9,33,0,0,100,-74,100
,-76,20,-71,20
440 DATA 80,20,79,0,76,0,76,20,7
4,120,74,9,73,7,69,14,71,20,51,1
```

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```
20,52,16,55,16,57,6,61,6,64,10,6
8,12,68,0,50,100,32,120,26,20,25
,18,29,17,29,4,23,120,23,16,21,2
0,23,16,29,104,26,3,19,4,18,8,22
,10,22,13,16,12,16,16,11,18,10,2
0,10,16,13,13,17,0
450 DATA -74,100,-76,20
460 DATA 80,0,76,10,82,20,75,120
,76,10,74,0,71,0,67,18,66,11,64,
14,65,2,68,6,71,0,51,100,63,2,61
,9,58,12,60,16,53,20,50,120,49,1
3,46,10,47,14,45,17,43,14,44,15,
40,4,34,2,32,0,25,0,23,100,21,3,
20,109,18,11,18,7,20,9,21,102,21
,0
470 DATA 10,100,12,8,10,20,10,10
0,8,2,5,2,0,0,-7,0,-16,5,-18,8,-
35,7,-54,6,-56,8,-56,13,-54,6,-5
3,11,-38,18,-38,20,-77,120,-72,2
0,-70,16,-63,20,-67,15,-71,9,-76
,0
480 DATA 82,0,84,20,66,120,61,16
,67,4,69,5,75,0,53,100,51,4,51,0
,46,1,51,4,48,7,46,1,10,100,7,3,
6,10,0,12,-3,20,-21,120,-24,14,-
34,9,-33,3,-36,5,-38,0,-78,120,-
77,0
490 DATA 84,0,82,20,75,10,73,15,
66,0,20,100,-3,100,-7,5,-21,0,-7
8,100,-72,20
500 DATA 64,3,67,9,66,0,64,3,50,
120,53,19,56,17,59,18,59,17,57,1
6,55,16,54,12,51,12,51,14,55,16,
54,17,50,16,50,20,48,13,47,14,42
,14,42,11,36,11,35,15,36,19,42,2
0,33,120,35,15,33,12,28,10,23,5,
14,3,5,11,5,20,-70,120,-72,0
```

110 5
END 33

Listing 2: PAGETURN

```
10 CLEAR200,&H7FA0:DEFUSR0=&H7FA
1:DEFUSR1=&H7FC7
20 CLS:PRINT"SPINNING EARTH -- T
HE DELBOURGOS":PRINT" HAVE YOU R
EMEMBERED TO ENTER"
30 PRINT" POKE28160,0:POKE25,110
:NEW        for disk  OR":PRINT" P
OKE26112,0:POKE25,102:NEW        f
or tape?"
40 PRINT:PRINT" IF YOU HAVE, PRE
SS <ENTER>;       OTHERWISE <BREAK
>, ENTER POKES, AND RELOAD THE P
ROGRAM."
50 IFINKEY$<>CHR$(13)THEN50
```

```
60 PRINT:PRINT" LOAD FROM <T>APE
 OR <D>ISK?"
70 A$=INKEY$:IFA$<>"T"ANDA$<>"D"
THEN70
80 PRINT" GET YOUR TAPE/DISK REA
DY...      AND THEN HIT ANY KEY."
90 IFINKEY$=""THEN90
100 FORI=&H7FA1 TO&H7FFF:READD:P
OKEI,D:NEXTI
110 DATA189,179,237,52,4,31,137,
141,50,31,1,53,4,141,44,31,3,16,
142,6,0,26,80,127,255,223,236,12
9,237,193,49,62,38,248,127,255,2
22,57,189,179,237,77,38,48,141,1
3,31,1
120 DATA220,183,147,186,159,186,
48,139,159,183,57,90,193,35,34,2
8,150,188,192,20,36,4,203,20,134
,128,52,2,134,6,61,235,224,79,30
,137,77,43,4,145,25,36,1,57,126,
180,74
130 PMODE2,15:PCLS:SCREEN1,0
140 FORP=1TO35STEP2
150 IFA$="D"THENLOADM"PAGE"+MID$
(STR$((P+1)/2),2),21504
160 IFA$="T"THEN:CLOADM"PAGE"+MI
D$(STR$((P+1)/2),2),21504
165 A=USR0(35*256+P):A=USR0(36*2
56+P+1)
170 NEXTP
180 FORP=1TO35STEP2:A=USR1(P):SC
REEN1,1:FORT=1TO40:NEXTT,P:GOTO1
80
```

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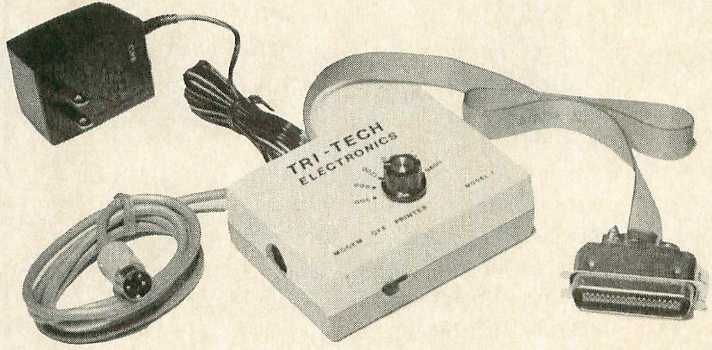

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Division Tutor	3-7	16K-Ext.	14.95
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Equations Linear	7-9	32K-Ext.	19.95
Equations Quadratic	8-11	32K.Ext.	19.95
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Fraction Diagnostic Disk	4-9	32K-disk	49.95
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Area & Perimeter	5-8	32K-Ext.	19.95
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PROGRAM TITLE	GRADES	MEMORY	PRICE
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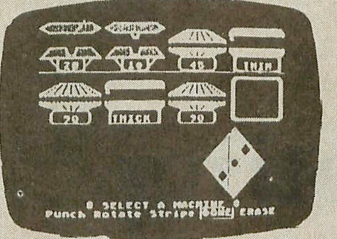

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BITS AND BYTES OF BASIC

With five years of data stored in a notebook, the author decides it's time to create a spreadsheet to analyze it

Spreadsheeting Real Data

By Richard A. Whit
Rainbow Contributing Edito

I got my CoCo in late 1980. Then, it was a new machine and there was no software available except a few ROM packs from Radio Shack. The only practical thing to do was learn to program in BASIC. One of the first things I learned was that it takes three to four weeks to learn enough BASIC to use up the memory in a 4K machine.

By April 1981, I had upgraded to 16K. Extended BASIC was out and I had that, also. Each of those items cost as much as a 64K CoCo costs today. And, I was working on one of my first "major" programs: a program to calculate gas mileage for my recently purchased new car. That was a good learning exercise though it consumed hours and hours.

The program finally worked, though there were weaknesses. Editing data entry errors was difficult and missing data caused problems. The display of results was limited and there was no code to scroll up and down the data. All in all, I found little encouragement to continue using the program or to rewrite it. However, I continued to write down each gasoline purchase, the date and the mileage, though the rest of the family failed to do so from time to time.

Now it's 1985 and I have five years of data in a notebook. Why not do a quick spreadsheet to analyze that data and see what it may have to say?

> ***"When setting out to analyze data, it is important to determine what is significant and what is not. The methods used in the analysis can then be selected and properly applied."***

When setting out to analyze data, it is important to determine what is significant and what is not. The methods used in the analysis can then be selected and properly applied. In this case, the tank was not always completely filled at each purchase, so the mileage fo each single gasoline purchase is meaningless in some cases. Determining th average mileage over three to fiv purchases will reduce these variations.

On the other hand, averaging wil hide some real peaks and valleys leavin only longer term trends like diminishin performance for lack of engine maintenance, or the mileage loss due to ver cold weather in winter and use of ai conditioning in the summer.

I chose to use a five point movin average. This means the mileage ca culated is averaged over the last fiv gasoline purchases.

The other data to be entered will b the odometer reading for each purchas and the month (number) of eac purchase. We will use the month lat when we do some data plotting.

The finished spreadsheet with son data is shown in Figure 1. Colum headings in cells A5 . . . D5 are rig justified to align better over the da in the columns. Data in columns ' through 'C' is entered as numbe *DynaCalc* shows the numbers in c umns 'A' and 'B' as they are entere Column C was formatted for t decimal places.

(Richard White has a long background with microcomputers and specializes in BASIC *programming. With Don Dollberg, he is the author of the* TIMS *database management program.)*

You may remember that in *DynaCalc* an empty cell will not take a format, however, a space may be typed into cell C6 and a format can be applied to that cell. C6 can then be replicated down Column C. The cells will still look empty, but the format is there waiting to act when you type in a value. Columns 'D' and 'E' are formatted also, but each cell contains a formula and is willing to accept a format.

Before moving to the formulae, let's look at the data. The 4.4 gallons shown in C12 represents a partial fill because the car was driven almost 300 miles since the last fill. This causes the calculated average gas mileage, 32 mpg, to be erroneously high, but not excessively so due to the use of the averaging over five data points. The next purchase was a fill-up and the new gas mileage is a better representation.

The data for cells B16 and C16 was missing. Nothing to do in this case but make a guess of both miles and gallons and enter these. After all, we are dealing with a data set that cannot be duplicated as you might with laboratory data. What is gone is gone forever. However, we do know on an average what mileage we are getting and can make an educated guess.

I later found an even better way. Pick some estimated miles where gas was probably added and divide that number by average gas mileage then being obtained. If the last fill-up occurred at 45,600 miles, the estimated miles at the next fill-up is 45,850 and the car is getting approximately 28 miles per gallon, the entry in the gallons column would be 250/28. The computer will perform the calculation and print 8.93 in the cell. Even better, *DynaCalc* stores the entry as 250/28 which is shown on the cell contents line at the top of the sheet when the cursor is placed over the cell.

At the top of the spreadsheet we do not have five data pieces to average so we start out with a simple average formula in D7. While there are gallons shown in C6, this serves only to start with a full tank and is not used in the calculations. In D8, we have two fills to work with and set up the form of the equations we will use for the remainder of Column D.

The formula in D11 has five purchases o average. This formula can be replicated to the rest of the column, as long as you want to make it. I took it to Row 150, which will cover several years. Before doing the replicate, remember to apply the two-decimal place format. Note in each of the succeeding equations the cell addresses are adjusted one row down in each case. This is another example of relative addressing discussed in previous columns.

Column E is set up to plot the mileage as a bar graph. I expected all the mileage values would exceed 15, so I subtracted that amount from each 'D' column value and applied a graph format to each cell. Actually, do this only to cell E7, then replicate that cell over the range E8 . . . E150. Again the addressing is relative.

In cell D152, the average mileage

```
    [A ][   B   ][   C   ][   D   ][         E          ]
  1-     GASOLINE MILEAGE
  2-     1980 HORIZON
  3-     NEW 9/80  10 MILES
  4-     START 9/2/83
  5-  MO     MILES  GALLONS  MILEAGE15   20   25   30
  6-   9     43433    10.90
  7-   9     43663     8.50    27.06 ############
  8-   9     43889     8.50    26.82 ############
  9-  10     44131     8.60    27.27 ############
 10-  10     44448    10.20    28.35 #############
 11-  10     44751    11.10    28.10 #############
 12-  10     45035     4.40    32.06 #################
 13-  11     45172    10.40    28.70 ##############
 14-  11     45407     8.80    28.42 #############
 15-  11     45600     6.89    27.70 #############
 16-  12     45950    10.00    29.61 ###############
 17-  12     46200     8.93    25.88 ###########
 18-  12     46492    10.20    29.45 ##############
 19-  12     46729     9.50    29.04 ##############
 20-   1     46978     9.99    28.34 #############
```

Figure 1

```
  [A ][   B   ][   C   ][             D              ][         E          ]
 1-     GASOLINE MILEAGE
 2-     1980 HORIZON
 3-     NEW 9/80  10 MILES
 4-     START 9/2/83
 5-  MO    MILES  GALLONS                        MILEAGE15   20   25   30
 6- 9    43433    10.9
 7- 9    43663    8.5       (B7-B6)/C7                D7-15
 8- 9    43889    8.5       (B8-B6)/@SUM(C7...C8)     D8-15
 9- 10   44131    8.6       (B9-B6)/@SUM(C7...C9)     D9-15
10- 10   44448    10.2      (B10-B6)/@SUM(C7...C10)   D10-15
11- 10   44751    11.1      (B11-B6)/@SUM(C7...C11)   D11-15
12- 10   45035    4.4       (B12-B7)/@SUM(C8...C12)   D12-15
13- 11   45172    10.4      (B13-B8)/@SUM(C9...C13)   D13-15
14- 11   45407    8.8       (B14-B9)/@SUM(C10...C14)  D14-15
15- 11   45600    193/28    (B15-B10)/@SUM(C11...C15) D15-15
16- 12   45950    10        (B16-B11)/@SUM(C12...C16) D16-15
17- 12   46200    250/28    (B17-B12)/@SUM(C13...C17) D17-15
18- 12   46492    10.2      (B18-B13)/@SUM(C14...C18) D18-15
19- 12   46729    9.5       (B19-B14)/@SUM(C15...C19) D19-15
20- 1    46978    9.99      (B20-B15)/@SUM(C16...C20) D20-15
```

Figure 2

```
      [A ][   B   ][   C   ][             D              ]
149-                          (B149-B144)/@SUM(C145...C149
150-                          (B150-B145)/@SUM(C146...C150
151-
152-GRAND AVERAGE MILEAGE (@MAX(B7...B150)-B6)/@SUM(C7...C150
```

Figure 3

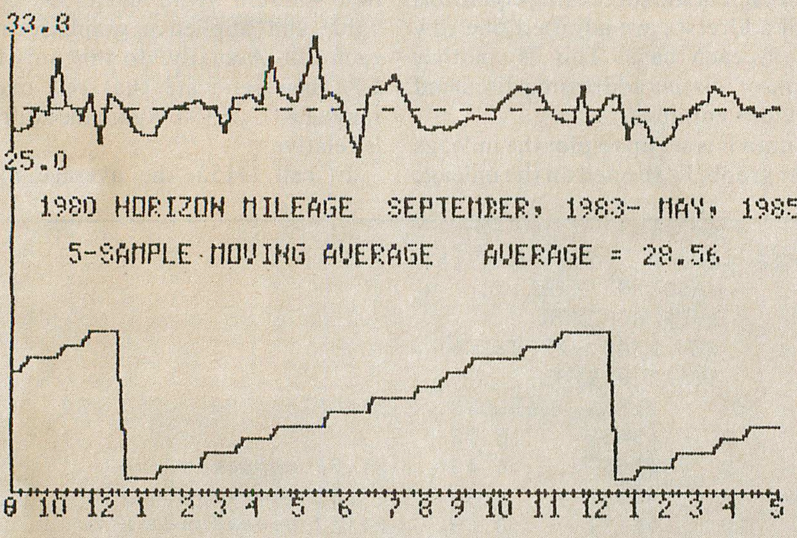

Figure 4

based on all the data in the spreadsheet is calculated. B7 is the starting miles. @MAX(B7 . . . B150) finds the highest number in the range B7 . . . B150. This will be the miles in the last entry. Data can be entered from time to time and the spreadsheet will still work. @SUM(C7 . . . C150) sums only cells that have values.

DynaCalc has a plotting capability that is unique in CoCo spreadsheets. You can make a line plot, a bar chart, a pie chart or a high/low/average plot such as those used to show stock performance. Plots are made on the high resolution graphics screen.

Data to be plotted is drawn from specified ranges of cells on the spreadsheet with a maximum of 121 cells per range. Except for the pie chart, up to three ranges may be defined. The graph is automatically sized according to the value extremes within the ranges specified. Once the plot is made, you can type captions onto it, save it to disk or print it on your printer.

The graph in Figure 4 is a printout of a plot of my gas mileage data. This is actually a composite of two plots. First, a plot of identical ranges from the mileage and month columns was made. The gas mileage line is at the top.

Since the months were entered as numbers from 1 to 12, they plot as a stepped line at the bottom of the chart. The text and numbers on the plot are made in the caption mode. The arrow keys are used to move the cursor to where the user wants and the text is typed in. Text can be erased by moving to its beginning and typing spaces. Careful, for the plotted lines can be erased as well.

The dashed line through the gas mileage curve is a calculated average for the data points used. This could not be done from the plot as shown since *DynaCalc* would have used both the month and the mileage values to determine an average.

First, I saved my captioned graph with both the mileage and month curves to disk, then I exited the graphics mode and reentered to get a clean screen. This time I plotted only the mileage figures and used the average line option. The first plot was then loaded. It overlaid the second. The result looks just like the first plot except the average line of the second shows.

Now comes the bottom line. What can be learned from this plot? First, the automobile performance has been essentially constant over the 21 month period. There are low spots each winter and high spots in the spring and fall. These seem to reflect the effects of driving in the cold and snow versus driving in moderate weather without air conditioning. The overall average mileage for this period was about one mile per gallon better than the previous two years reflecting an office move to a location where I could drive interstates for the most part, rather than all city streets. Finally, this data tells me the engine remains sound and in tune.

Other uses? Surely you can find them. How about lab and other reports for those in high school or college? Keeping and plotting sports statistics seems a natural. Budgeting is another — plot your budget amounts against what is actually spent. And the uses in business are almost limitless.

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16K
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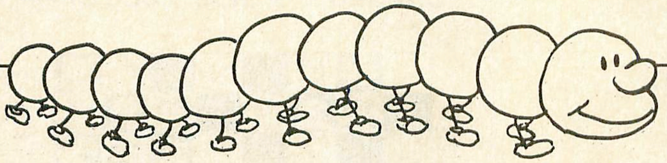
CoCo worms its way into preschool fun . . .

A Caterpillar's Alphabet

By Mike Knolhoff



As a teacher I am able to see and
evaluate educational software
quite frequently. This gives me
e opportunity to get ideas for pro-
ams I can write for my own children
for my classes.

I recently saw an interesting program
at was written for a more expensive
mputer. The program was designed
help preschoolers or primary school
ildren learn the alphabet. A sequence
five letters was displayed in order
the screen with the middle letter left
ank. The student was to figure out
ich letter went in the blank and type
at letter. The letter typed would then
in the blank, and a right or wrong
e would be given.

Each time the student typed the
rrect letter, a caterpillar segment
uld appear on the screen until the
erpillar was complete. At that time
the caterpillar would walk around and off the screen as a visual reward for a job well done. Tapping any key would then restart the program.

---

*ike Knolhoff is a 6th grade teacher
o is married and has three children.
is currently earning a master's
gree emphasizing computer applica-
ns in education.)*

The program required no reading skills on the part of the student, and all keyboard input from the student consisted of single keystrokes. The program was written in machine language and sold for about $30.

The listing that follows is my version of this program. Thanks to the powerful graphics commands Tandy gave the CoCo, it is written entirely in BASIC. Admittedly, the graphics are not as refined and the animation not as smooth as its inspiration program, but it does function in much the same manner (and is a great deal more economical). I believe parents will find it very beneficial for their 4-6 year old children.

You need 16K Extended BASIC for the program. It uses the speed-up `POKE` in Line 690, so if your computer cannot handle this `POKE` you will have to edit that line to remove it. It will run on disk as well as cassette.

The following is a brief line description of the program:

Line	**Description**
10-20	Program set up
30-80	Title screen
90-250	`DRAW` and `GET` caterpillar segments
260-340	Put letter sequence on the screen
350-370	Receive keyboard input
380-390	Display answer in blank spot
400	Branch to 570 on correct answer
410-420	Wrong answer cue
430	Second try for first wrong answer
440-490	Flash correct answer
500-550	Erase sequence of letters
560	Return to start of loop
570-670	Put caterpillar segment on screen
680-840	Animation routine moves caterpillar left to right and off screen
850-1070	Animation routine moves caterpillar right to left and off screen
1080-1090	Await key press to begin again
1100-1380	Draw strings for letters of the alphabet

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floating point optimization

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named, multiple arguments
WHILE-DO and IF-THEN-ELSE
All execution errors trappable
Fast, 65K char string facilities
Assembly language interface
Fast Decimal f.p. arithmetic
(no money conversion errors!)

Cursor positioning
Print USING
Device-independent ASCII and
binary file I/O to the byte
Indexed file option available

$49.95 (requires SDOS)
Not RSBASIC compatible

SEDIT/TYPE: Word Processing

SEDIT: full screen text editor
Place cursor and start typing!
What-you-see-is-what-you-get
Typeahead and autowrap on margin
"No wrap" mode for programs
Edits files up to 80Kb
Global Search/Change
SEDIT or SDOS can use 24 by 80
CRT via modem card with multipak

TYPE: Document Processor

Formats raw text mode with SEDIT
according to embedded commands
Automatic justification
Automatic pagination
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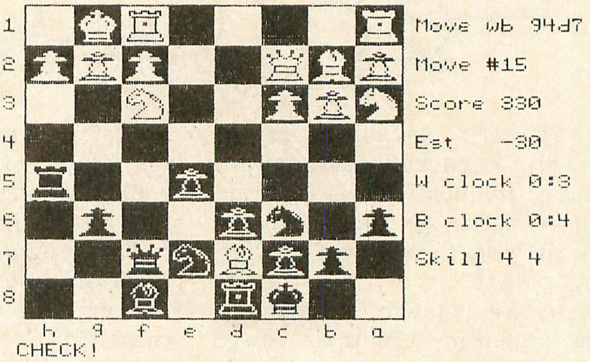

```
Move wb g4d7
Move #15
Score 330
Est    -30
W clock 0:3
B clock 0:4
Skill 4 4
CHECK!
```

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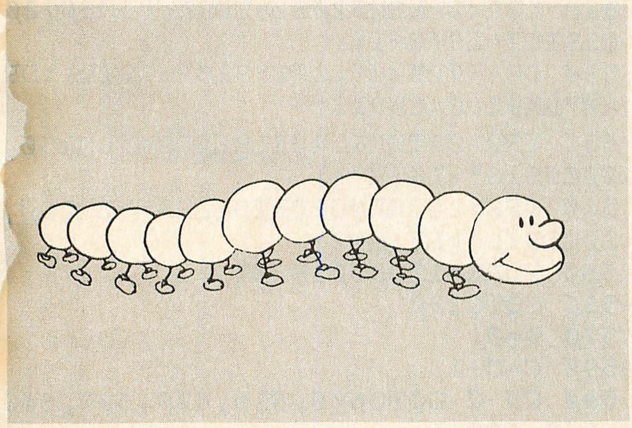
140 214
390 128
590 187
770 213
960 229
1150 106
END 212

The listing: LETRSKIP

```
1 '****************************
2 '     CATERPILLAR
3 '     LETTER SKIP
4 '****************************
5 '          BY
6 '    MIKE KNOLHOFF
7 '    STERLING, IL.
8 '       MAY 1984
9 '****************************
10 C=0:DIMH1(14),B(14),H2(14),BL
(14)
20 CLS2:GOSUB1110
30 PRINT@201," CATERPILLAR ";:PR
INT@265," LETTER SKIP ";
40 A$="T3O3L4CP32L8CP128L4DP32L8
DP128EP128GP128EP128L4.C"
50 PLAYA$
60 PLAY"P8L4CP32L8CP128L4DP32L8D
P128L4.EP128CP8"
70 PLAYA$
80 PLAY"P8L3AP32DP128L8FP128L4.E
P128L1C"
90 PMODE3,1:PCLS:SCREEN0,1
100 CIRCLE(20,20),8,6,.9:PAINT(2
0,20),6,6
110 CIRCLE(24,16),2,8
120 DRAW"BM26,22C8L6H2"
130 DRAW"BM18,14C8U4E4BR4G4D4"
140 GET(12,2)-(28,32),H1,G
150 PCLS
160 CIRCLE(20,20),8,6,.9:PAINT(2
0,20),6,6
170 CIRCLE(16,16),2,8
180 DRAW"BM14,22C8R6E2"
190 DRAW"BM18,14C8U4H4BR4F4D4"
200 GET(12,2)-(28,32),H2,G
210 PCLS
220 CIRCLE(20,20),8,6,.9:PAINT(2
0,20),6,6
230 DRAW"BM18,26C8NG4BR4F4"
240 CIRCLE(20,20),4,8,.9
250 GET(12,2)-(28,32),B,G
260 PCLS
270 SCREEN1,1
280 R=RND(-TIMER)
290 R=RND(26)
300 IF R<3THEN310ELSEDRAW"BM0,20
C7S16"+L$(R-2)
310 IF R<2THEN320ELSEDRAW"BM50,2
0C7S16"+L$(R-1)
320 DRAW"BM92,64C8S16R12"
330 IF R>25THEN350ELSEDRAW"BM150
,20C7S16"+L$(R+1)
340 IF R>24THEN350ELSEDRAW"BM200
,20C7S16"+L$(R+2)
350 I$=INKEY$:IFI$=""THEN350
360 A=ASC(I$)-64
370 IFA<1OR A>26THEN350
380 DRAW"BM100,20C8S16"+L$(A)
390 FORK=1TO500:NEXTK
400 IFA=R THEN570
410 FORX=1TO50:PLAY"V30T255L255O
1CP250":NEXTX
420 W=W+1:DRAW"BM100,20C5S16"+L$
(A)
430 IFW=1THEN350
440 W=0:FORX=1TO5
450 DRAW"BM100,20C8S16"+L$(R)
460 FORK=1TO100:NEXTK
470 DRAW"BM100,20C5S16"+L$(R)
480 FORK=1TO100:NEXTK
490 NEXTX
500 IFR<3THEN510ELSEDRAW"BM0,20C
5S16"+L$(R-2)
510 IFR<2THEN520ELSEDRAW"BM50,20
C5S16"+L$(R-1)
520 DRAW"BM100,20C5S16"+L$(R):DR
AW"BM92,64C5R12"
530 IFR>25THEN540ELSEDRAW"BM150,
20C5S16"+L$(R+1)
540 IFR>24THEN560ELSEDRAW"BM200,
20C5S16"+L$(R+2)
550 FORK=1TO300:NEXT
560 GOTO290
570 W=0
580 C=C+1
590 ON C GOTO600,610,620,630,640
,650,660
600 PUT(96,100)-(112,130),H1,PSE
T:GOTO665
610 PUT(80,100)-(96,130),B,PSET:
GOTO665
620 PUT(64,100)-(80,130),B,PSET:
GOTO665
630 PUT(48,100)-(64,130),B,PSET:
GOTO665
640 PUT(32,100)-(48,130),B,PSET:
GOTO665
650 PUT(16,100)-(32,130),B,PSET:
GOTO665
660 PUT(0,100)-(16,130),B,PSET
665 FORX=1TO5:SCREEN1,0:FORK=1TO
150:NEXTK:SCREEN1,1:FORK=1TO150:
NEXTK:NEXTX
670 PLAY"T255L255V30O2CDEFGABO3C
DEFGABO4CDEFGABAGFEDCO3BAGFEDCO3
BAGFEDCO2BAGFEDC"
680 IFC<7THEN500
690 POKE65495,0:SCREEN1,0:X1=112
```

```
:X2=128:M$="V31O1T255L255CP255C"
700 FORK=1TO8
710 PUT(X1,100)-(X2,130),H1,PSET
720 PUT(X1-16,100)-(X2-16,130),B
,PSET
730 PUT(X1-112,100)-(X2-112,130)
,BL,PSET
740 PLAYM$:FORD=1TO50:NEXTD
750 X1=X1+16:X2=X2+16
760 NEXTK
770 PUT(224,100)-(240,130),B,PSE
T
780 PUT(128,100)-(144,130),BL,PS
ET:PLAYM$:FORD=1TO120:NEXTD
790 X1=144:X2=160
800 FORK=1TO6
805 PUT(224,100)-(240,130),BL,PS
ET
810 PUT(X1,100)-(X2,130),BL,PSET
:PLAYM$
815 PUT(224,100)-(240,130),B,PSE
T
820 FORD=1TO80:NEXTD
830 X1=X1+16:X2=X2+16:NEXTK
```



```
835 PUT(224,100)-(240,130),BL,PS
ET
840 FORD=1TO800:NEXTD
850 PUT(224,150)-(240,180),H2,PS
ET:PLAYM$:FORD=1TO120:NEXTD
860 X1=208:X2=224:FORK=1TO6
870 PUT(X1,150)-(X2,180),H2,PSET
880 PUT(X1+16,150)-(X2+16,180),B
,PSET:PLAYM$
890 X1=X1-16:X2=X2-16
900 FORD=1TO80:NEXTD
910 NEXTK
920 X1=112:X2=128
930 FORK=1TO8
940 PUT(X1,150)-(X2,180),H2,PSET
950 PUT(X1+16,150)-(X2+16,180),B
,PSET
960 PUT(X1+112,150)-(X2+112,180)
,BL,PSET:PLAYM$
970 FORD=1TO50:NEXTD
980 X1=X1-16:X2=X2-16:NEXTK
990 PUT(96,150)-(112,180),BL,PSE
T
1000 PUT(0,150)-(16,180),B,PSET:
PLAYM$
1010 FORD=1TO120:NEXTD
1020 X1=80:X2=96
1030 FORK=1TO6
1035 PUT(0,150)-(16,180),BL,PSET
1040 PUT(X1,150)-(X2,180),BL,PSE
T:PLAYM$
1045 PUT(0,150)-(16,180),B,PSET
1050 FORD=1TO80:NEXTD
1060 X1=X1-16:X2=X2-16
1070 NEXTK
1075 PUT(0,150)-(16,180),BL,PSET
1080 I$=INKEY$:IFI$=""THEN1080
1090 POKE65494,0:C=0:SCREEN1,1:G
OTO500
1100 END
1110 DIML$(26)
1120 L$(1)="BD10U5NR8U1E4F4D6BR4
BU10"
1130 L$(2)="D10R6E2U1H2NL6E2U1H2
L6BR12"
1140 L$(3)="BR3NR5G3D4F3R5BR3BU1
0"
1150 L$(4)="D10R5E3U4H3L5BR12"
1160 L$(5)="NR8D5NR6D5R8BR4BU10"
1170 L$(6)="NR8D5NR6D5BR12BU10"
1180 L$(7)="BR8L6G2D6F2R4E2U3L4B
R8BU5"
1190 L$(8)="D10U5R8D5U10BR4"
1200 L$(9)="BR1R6L3D10L3R6BR5BU1
0"
1210 L$(10)="BR2R6L3D8G2L1H2U2BR
12BU6"
1220 L$(11)="D10BR8L1H5NL2E5R1BR
4"
1230 L$(12)="D10R8BR4BU10"
1240 L$(13)="ND10F4E4ND10BR4"
1250 L$(14)="ND10D1F8D1U10BR4"
1260 L$(15)="BR2G2D6F2R4E2U6H2L4
BR10"
1270 L$(16)="ND10R6F2D1G2L6BR12B
U5"
1280 L$(17)="BR2G2D6F2R4E1NH3NF1
E1U6H2L4BR10"
1290 L$(18)="ND10R6F2D1G2L6R1F5B
R4BU10"
1300 L$(19)="BR8L6G2D1F2R4F2D1G2
L6BR12BU10"
1310 L$(20)="R4ND10R4BR4"
1320 L$(21)="D8F2R4E2U8BR4"
1330 L$(22)="D6F4E4U6BR4"
1340 L$(23)="D10E4NU1F4U10BR4"
1350 L$(24)="D1F8D1BL8U1E8U1BR4"
1360 L$(25)="D1F4ND5E4U1BR4"
1370 L$(26)="R8D1G8D1R8BR4BU10"
1380 RETURN
```

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John Hancock

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GAME SHORTIES

Now, just the moment you've been waiting for . . .

Hip, Hip, Hooray! Oodles

A Mind Boggler

See if you can solve this *Picstick* puzzle. Play against the computer, alternating turns until all 15 sticks are taken. The object is to force the computer to take the last stick. Each turn (your's and the computer's) is limited to one, two or three sticks. Of course, when you figure out the correct pattern you will always win. But, how long will that take?

The listing: PICSTICK

```
 1 CLS:PRINT"PICK UP STICKS":PRIN
T
 2 PRINT" YOU MAY PICK UP 1,2, OR
  3"
 3 PRINT" STICKS EACH TIME. THE O
BJECT"
 4 PRINT" IS TO MAKE THE COMPUTER
  PICK"
 5 PRINT" THE LAST ONE. PRESS ENT
ER"
 6 PRINT" WHEN YOU ARE READY."
 7 INPUT A$
 8 CLS(0)
 10 FOR I=1 TO 15
 20 FOR J=16 TO 31
 30 SET(I*4,J,4)
 40 NEXT J
 50 NEXT I
 60 SW=1 :T=15
 100 PRINT@0,"ENTER NO. (1,2, OR
 3)"
 110 INPUT A$
 120 A=VAL(A$)
 130 IF A<1 OR A>3 THEN 100
 140 T=T-A
 145 PRINT" STICKS CHOSEN="A" REM
AIN="T
 150 IF T>0 THEN 180
 160 IF SW=1 THEN PRINT@0,"YOU LO
SE" ELSE PRINT@0,"YOU WIN"
 170 GO TO 1000
 180 SW = -SW
 190 B=(15-(T+A))+1:B1=(B+A)-1
 200 FOR I=B TO B1
 210 FOR J=16 TO 31
 220 RESET(I*4,J)
 230 NEXT J
 240 NEXT I
 250 IF SW=1 THEN 100
 260 ST=T-1
 270 MC=0
 280 IF MC=3 THEN 360
 290 MC =MC+1
 300 A=(ST-MC)/4
 310 A=ABS(A)
 320 A=A-INT(A)
 330 IF A<>0 THEN 280
 340 A=MC
 350 GOTO 140
 360 A=1
 370 GOTO 140
 1000 PRINT@32,"END GAME"
 1010 PRINT"RESTART = ENTER"
 1020 INPUT A$:GOTO 8
```

Brian Baxter
Arlington, TX

Where Are the Walls?

The Maze Game begins with a man (in the upper left corner of a blank screen) and a blue dot (in the lower right corner of the screen) indicating an exit. Your goal is to find your way out of the dark maze, however, the walls are invisible. They only appear as you run into them.

The listing: MAZEGAME

```
 10 REM MAZE
 20 DIM A$(16)
 30 MV=0:F=3
 40 GOSUB 700
 60 FOR I=1 TO 16
 70 READ A$(I)
 80 NEXT I
 90 READ L,E:X=INT(L/100):Y=L-(X*
```

f Games For 4K

```
100)
95 EX=INT(E/100):EY=E-(EX*100)
100 CLS(0):MX=X:MY=Y
101 SET(EY*2,(EX-1)*2,3)
105 GOSUB 400
120 B$=INKEY$
123 IF EX=X AND EY=Y THEN 800
125 IF B$="" THEN 120
130 MX=X:MY=Y
140 IF B$="U" AND X>1 THEN MX=X-
1
150 IF B$="D" AND X<16 THEN MX=X
+1
160 IF B$="L" AND Y>1 THEN MY=Y-
1
170 IF B$="R" AND Y<32 THEN MY=Y
+1
180 IF MID$(A$(MX),MY,1)="W"THEN
 GOSUB200 ELSE GOSUB300
190 GOTO 120
200 REM WALL
210 II=(MX-1)*2:IJ=(MY-1)*2
220 FOR I=II TO II+1
230 FOR J=IJ TO IJ+1
240 SET(J,I,8):NEXT J
250 NEXT I:RETURN
300 REM RESET/SET POSITION
310 II=(X-1)*2:IJ=(Y-1)*2
320 FOR I=II TO II+1
330 FOR J=IJ TO IJ+1
340 RESET(J,I)
350 NEXT J:NEXT I
400 II=(MX-1)*2:IJ=(MY-1)*2
410 FOR I=II TO II+1
420 FOR J=IJ TO IJ+1
430 SET(J,I,5)
440 NEXT J:NEXT I
445 X=MX:Y=MY:MV=MV+1
450 RETURN
500 DATA WWWWWWWWWWWWWWWWWWWWWWW
WWWWWWWWW
510 DATA WSWSSSWSSWSSSWSSSWWFSWS
WSSSWSSSW
520 DATA WSWSWSWSWWSWSWSWSSSWSWS
WSWSSSWSW
530 DATA WSSSWSWSSSSWSWSWWWSWSWS
WSSWWWWSW
540 DATA WWWWWSWSWSWSSWSSSWSWSWS
WWSSSSWSW
550 DATA WSSSSSSSWSWSSSWWSWSWSSS
WSWWSSWSW
560 DATA WSWSWWWWWSWSWSSSSSSSSWS
SSSSSWSSW
570 DATA WSWSWSSSWSSSSWWWWSSWSSW
WWWWWWSWW
580 DATA WSWSSSWSWWWWSSSSSWSWSWS
SSSSSWSSW
590 DATA WSSWWWWSWSSSWFWWWWWWSWS
WSWWSSWSW
600 DATA WWFWSSSSWSWSSWSSSSSWSWS
WSSSWSSSW
610 DATA WWWWSWWWWSSWSWSWWWSWSWW
WWWSWWWSW
620 DATA WSSSSWSSSWSWSWSSSWSWSWS
SSSSWSSSW
630 DATA WSWWWSSWSWSWSSSWSWSWSWW
SWWWWWWWW
640 DATA WFSSSSWWSSSWSWWWSWSWSFW
SSSSSSSSW
650 DATA WWWWWWWWWWWWWWWWWWWWWWW
WWWWWWWSW
660 DATA 0202,1631
700 CLS:PRINT"MAZE (VERISION 1)"
710 PRINT:PRINT"FIND YOUR WAY OU
T"
720 PRINT"U=UP D=DOWN L=LEFT R=R
IGHT"
725 PRINT"EXIT IS BLUE SQUARE"
730 PRINT"PRESS 'ENTER' TO START
"
740 INPUT B$
750 RETURN
800 CLS:PRINT"YOU MADE IT OUT IN
"MV"MOVES."
```

Brian Baxter
Arlington, TX

Watch Out, Danny Sullivan!

Indy4K is a road race in which you control a super-fast car with your right joystick. Stay on the road for as many miles as you can.

If your CoCo can not take the "Vitamin E" POKE, delete it from Line 0.

The listing: INDY4K

```
0 POKE65495,0:CLS:PRINT@106,"KAM
AKAZIE KAR":PRINT@175,"BY":PRINT
@238,"PAUL":PRINT@269,"WAGORN":P
RINT@334,"FOR":PRINT@397,"APOLLO
":PRINT@428,"SOFTWARE"
1 SOUND 100,4:SOUND140,5:SOUND10
0,1:SOUND140,1:SOUND100,1:SOUND1
10,1:SOUND120,1:SOUND130,1:SOUND
140,1:SOUND130,2:SOUND120,4:SOUN
D110,8:SOUND100,10
2 FORPO=503 TO 23 STEP -64:PRINT
@PO,"!";
3 POKE65315,63:FORI=1TO255STEP9:
POKE65312,255:POKE65312,I:NEXT
4 PRINT@PO-31,"!";:POKE65315,63:
FORI=1TO255STEP9:POKE65312,255:P
OKE65312,I:NEXT:NEXTPO
5 PRINT@490,"PRESS A KEY";:EXEC4
1329
6 C1$=CHR$(132+96)+CHR$(143+48)+
CHR$(136+96):C2$=CHR$(132+96)+CH
R$(140+48)+CHR$(136+96):WL$=CHR$
(194):CLS:P=15:S$=CHR$(255):M$=C
HR$(128):R$=CHR$(131+32)+S$+M$+M
$+M$+M$+WL$+M$+M$+M$+S$+CHR$(131
+32):RP=12
7 FORI=1 TO20:PRINTTAB(RP);R$:NE
XT:PRINT@P,C1$;:PRINT@P+32,C2$;:
PRINT@14+98,"start";:SOUND100,1:
SOUND200,3:SOUND50,3:SOUND100,1:
SOUND140,2:SOUND130,3:SOUND110,4
:SOUND100,5:SOUND90,6:SOUND80,7:
PRINT@0,"";
8 CD=RND(3)-2:FORL=1TO 4
9 D=D+1
10 IF JOYSTK(0)=<3 AND P>=1 THEN
 P=P-1:ELSEIFJOYSTK(0)>=60 ANDP<
=28 THENP=P+1
11 KI=P+64+1024:IFPEEK(KI)=255OR
PEEK(KI+1)=255ORPEEK(KI+2)=255TH
EN 16
12 PRINTTAB(RP);R$
13 GOSUB15:IFRP+CD>0ANDRP+CD<18T
HENRP=RP+CD:NEXTL:ELSEGOTO8
14 GOTO 8
15 PRINT@P,C1$;:PRINT@P+32,C2$;:
PRINT@479,"":RETURN
16 E1$=CHR$(139+48)+CHR$(140+16)
+CHR$(141+48):E2$=E1$:E3$=CHR$(1
41+16)+CHR$(131+96)+CHR$(139+16)
:E4$=E3$:FORI=1TO5:PRINT@P,E1$;:
PRINT@P+32,E2$;:POKE65315,63:FOR
R=1TO4:POKE65312,255:POKE65312,R
ND(255):NEXT:PRINT@P,E3$;:PRINT@
P+32,E4$;
17 SOUND200,1:NEXTI
18 SOUND10,4:SOUND40,2:SOUND1,1:
SOUND10,1:SOUND40,4:SOUND20,1:PR
INT@230,"MILELAGE:"D/20"MILES."
19 PRINT@480+RP+1,"PRESS A KEY";
:POKE65314,14:EXEC41329:CLEAR:GO
TO6
20 FORI=1TO 4:MOTORON:FORK=1TO50
0:NEXT:SOUND1,4:FORK=1TO500:NEXT
:CSAVE"KAM KAR":NEXT
```

Paul Wagorn
Carp, Ontario

Screen Cleaning

Use the arrow keys in *Cleanup* to travel the screen and clean up all of the characters. But, don't touch the outer walls or any of the graphics.

The listing: CLEANUP

```
5 CLEAR 500:CLS
10 PRINT:PRINT"(PRESS ANY KEY TO
 START)"
15 A$=INKEY$:IF A$=""THEN 15
20 CLS:BL=0:SC=0:INPUT"STARTING
LEVEL(1-50)";S:IF S<1 OR S>50 TH
EN 20
25 CLS(0):PRINT"SCORE=";SC
30 FOR X=0 TO S*3-1
35 P=RND(375)+96:IF PEEK(P+15360
)<33 THEN PRINT@P,CHR$(RND(63)+1
28);ELSE35
40 NEXT X
45 FOR X=0 TO S*3-1
50 P=RND(375)+97:IF X/3=INT(X/3)
 THEN IF PEEK(P+15360)<33 THEN P
RINT@P,CHR$(RND(94)+32);ELSE 50
55 NEXT X
60 FOR X=0 TO 63:SET(X,3,5):SET(
X,31,5):NEXT X:FOR X=4 TO 31:SET
(0,X,5):SET(63,X,5):NEXT X
65 X=5:Y=5:U=0:H=0:A$=INKEY$:FOR
 D=1 TO 2 STEP 0:IF INKEY$<>""TH
EN D=2:NEXT D ELSE NEXT D
70 K$=INKEY$
75 IF K$=CHR$(94) THEN U=-1:H=0
ELSE IF K$=CHR$(10) THEN U=1:H=0
 ELSE IF K$=CHR$(8) THEN U=0:H=-
1 ELSE IF K$=CHR$(9) THEN U=0:H=
1
80 X=X+H:Y=Y+U:IF POINT(X,Y)>1 T
HEN 100
```

```
85 IF POINT(X,Y)=-1 THEN SC=SC+1
:BL=BL+1:PRINT@7,SC;
90 SET(X,Y,1):IF BL<S THEN 70
95 CLS:PRINT"LEVEL";S;"COMPLETED
...BONUS:";S*5:SC=SC+S*5:BL=0:S=
S+1:FOR D=1 TO 1000:NEXT D:GOTO
25
100 SOUND 45,1:CLS:PRINT"YOU MAD
E IT TO LEVEL "S;"WITH A SCORE O
F "SC
```

Stephan J. Elms
Fort Ann, NY

Hunt and Peck

Typanic will test your knowledge of the CoCo's keyboard, as well as your reflexes. Shoot down falling characters before they hit the ground by typing the appropriate key on the keyboard. If you miss five imes, the game is over and the CoCo displays your score.

The listing: TYPANIC

```
10 CLS:PRINT@43,"TYPANIC":PRINT:
PRINTTAB(7);"LEVEL:":PRINTTAB(7)
;"(1) BEGINNER":PRINTTAB(7);"(2)
 INTERMEDIATE":PRINTTAB(7);"(3)
EXPERT":PRINTTAB(7);"(4) PRETTY
DARN HARD"
20 A$=INKEY$:IF A$="" THEN 20
30 A=VAL(A$):IF A>4 OR A<1 THEN
20
40 POKE282,1:CLS:T=300-50*VAL(A$
)
50 PO=2+RND(28):C=32+RND(58)
60 C$=CHR$(C):Y=PO
70 A$=INKEY$
80 PRINT@Y,C$;:Y=Y+32
90 IF Y>448 THEN 130
100 IF A$=C$ THEN 150
110 FOR DL=1 TO T:NEXTDL:PRINT@Y
-32," ";
120 IF A$="" THEN 70 ELSE 70
130 SOUND 1,1:W=W+1:IF W=5THEN17
0
140 GOTO 50
150 T=T-A:SOUND 200,1:PRINT@Y-32
," ";:SC=SC+1:PRINT@0,SC:IFT<4 T
HEN T=5
160 GOTO50
170 CLS0:FOR S=200 TO 1 STEP -6
180 SOUND S,1:NEXTS
190 PRINT@160,"YOUR SCORE IS "SC
;
200 PRINT@224,"PLAY AGAIN (Y/N)?
";:A$=INKEY$:IFA$=""THEN200ELSEI
FA$="Y"THENRUN ELSEEND
```

Michael Sims
Nanuet, NY

Memory Jogger

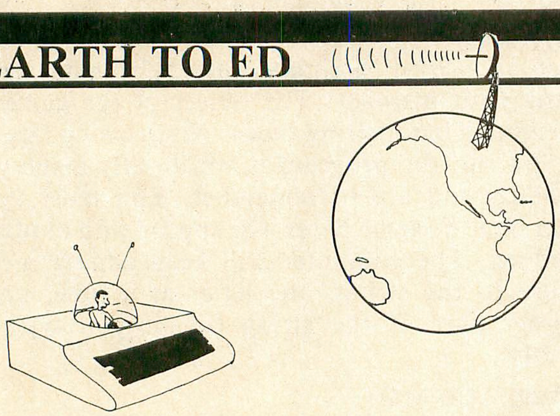
Letter Memory is a simple but challenging game that tests your memory. The object of the game is to remember a letter string that keeps growing larger. When you run the program it will briefly display a letter which you are to remember. You must type the letter and the same letter will appear with another letter added. The computer will keep adding more and more to the string, one letter at a time, until you forget part of the string (or, if you type it incorrectly).

The listing: LETRMMRY

```
10 '
20 ' LETTER MEMORY
30 ' BY BEN JOHNSON
40 '
50 SC=0
60 A$="ABCDEFGHIJKLMNOPQRSTUVWXY
Z"
70 CLS
80 FOR T=1 TO 255
90 GOSUB 140
100 INPUT F$
110 IF F$<>S$ THEN 220
120 SC=SC+T:IF T/5=INT(T/5) THEN
 SC=SC+5
130 NEXT T
140 R=RND(26)
150 D$=MID$(A$,R,1)
160 S$=S$+D$
170 D$=""
180 PRINTS$
190 FOR H=1 TO 500:NEXT H
200 CLS
210 RETURN
220 CLS3:PRINT"? ";F$:PRINT"SORR
Y, YOU LOST TRACK."
230 PRINT"SCORE: "SC
240 PRINT"CURRENT STRING:"
250 PRINTS$
260 GOSUB310
270 FOR L=1 TO E:PRINT@159+NM(L)
,"-":NEXTL
280 PRINT:PRINT"TAP <ENTER> TO P
LAY AGAIN..."
290 A$=INKEY$:IF A$<>CHR$(13) TH
EN 290
300 RUN
310 FOR J=1 TO LEN(S$)
320 IF MID$(S$,J,1)<>MID$(F$,J,1
) THEN E=E+1:NM(E)=J:NEXT ELSE N
EXT
330 FOR J=1 TO LEN(F$)
340 IF MID$(F$,J,1)<>MID$(S$,J,1
) THEN E=E+1:NM(E)=J:NEXT ELSE N
EXT
350 RETURN
```

Ben Johnson
Charlestown, WV

EARTH TO ED



Inverting The Output

By Ed Ellers
Rainbow Technical Writer

• *In your June 1985 issue, you recommended Radio Shack's* Hi-Res Screen Print Utility, *so maybe you can help me with this. My* PMODE 4 *diagrams are displayed with white lines on a black background, and* BWDUMP *prints them that way. However, I need black lines on white paper because the diagrams reproduce better that way. Is there a simple way (e.g., a set of* POKEs*) to invert the output from* BWDUMP?

Humphrey Bryson
Stratford, CT

I don't know of any way to make *BWDUMP* invert its printing, but you can invert the screen easily if your program is in BASIC. One way is to change PCLS to PCLS5 (to clear to white) and then use PRESET to "set" points to black and PSET to "reset" them to white when desired. Another is by running this program:

```
10 FOR Y=0 TO 191:FOR X=0 TO 255
20 S=PPOINT(X,Y):IF S=0 THEN
   PSET(X,Y) ELSE PRESET(X,Y)
30 NEXT X,Y
```

(Ed Ellers, a RAINBOW *and* PCM *staff member, is a self-confessed electronics fanatic whose other interests include science fiction.)*

CoCo Fender-Benders?

• *Some time ago there was mentioned an auto touch-up paint that could be used to touch up the original gray CoCo. Do you know what type of paint would be used?*

Harold L. Laroff
Monsey, NY

Strangely enough, the paint to use for this job is made to match late model Mercedes models' silver finish. You can find this at any auto parts store or (if you're desperate) at the parts department of a Mercedes-Benz dealer.

Where Did It Go?

• *When I load a machine language tape into my 64K ECB CoCo, then enter* PRINT MEM, *the* MEM *value remains the same. Could it be it's storing the value in high memory?*

Aaron Repath
Tucson, AZ

Yes it could, but that isn't causing the apparent discrepancy. The MEM value represents the amount of memory left for BASIC programs and variables; loading machine language file has no effect on th pointer.

Watching the Files Go By

• *We now find that we have more file on our disks than will display on on directory screen. We would like to do on of the following:*
1) Get a printout of the directory, or
2) Display the directory in two column as on the screen.
Do you have a solution to this problem?

John E. Bea
Boise, Il

Yes. To get a printout of a disk director just get your printer ready (and POKE 15 with the proper value, if needed), then ente POKE 111,254:DIR or DIR1. The POK redirects output from the screen to th printer. I've never had any luck using it fc other screen output.

DATA Statement Tricks

• *How can you input various items o*

information at prompts and then, by programming, transfer the information to a DATA *statement?*

For example:

```
(890):
10 LINE INPUT "CHECK NUMBER";C$
(9/12/84):
20 LINE INPUT "DATE";D$
(10.00):
30 LINE INPUT "$ AMOUNT;"A$

. . .

8900 DATA 890, "9/12/84", "10.00"
```

I am a magician, but don't know how to do this trick!

John R. Morrison
Beaver, PA

The third guess on your reply card was about right; it's like the Hindu rope trick that everyone talks about, but no one does. DATA statements are mainly intended for data items that are pretty well fixed and simply need to be tucked into memory when the program is run. It is possible, but hardly practical, to POKE in new lines like this; you would have to know all sorts of pointer addresses to get the lines in the right place with the proper format.

Board Conflicts

- *I have been using the CNR Engineering SP-1 internal serial interface board to connect my CoCo to an Epson MX-80 printer. I will soon have another Tandy computer which has parallel output. Can I plug this into my MX-80 without taking out the SP-1 serial board?*

Ralph J. Fusco, M.D.
Miami, FL

It would be best to take out the option board before using the MX-80 with a parallel interface. Leaving it in shouldn't do any damage, but the board's signals may interfere with the signals coming from the other computer.

ASCII Aggravation

- *Ever since I have owned my CoCo, I have had trouble saving and loading files in ASCII on tape. If I listen to the tape, I find that the signal is very weak. Everything works fine when using the binary mode.*

Rodney Lee Gibbons
Fairmont, WV

This sounds like a problem with your cassette recorder. Apparently the automatic level control circuit is increasing level during the blank spaces between blocks; when the block comes along, the ALC drops way down and takes some time to recover. The result is that the signal is recorded too weakly. If you don't have a Radio Shack computer recorder, I suggest getting one.

Does Frugality Pay Off?

- *I like to keep my disk drives clean, but I like to avoid waste, too. I use Radio Shack's drive head cleaning kit, and I've noticed that, although I follow directions to the letter, I've always got cleaning fluid left over. This is true even when I've used the cleaning disks the recommended 13 times each. Is it OK to continue to use these disks until the fluid is used up, or could that in some way damage my drives?*

Barry Friedman
Union, NJ

I wouldn't recommend using the cleaning disks more than 13 times simply because there's that much more chance of fouling the head from some large particle. Since you seem to have more fluid than you need, you might want to use it to clean the heads of your tape recorder (if you use one).

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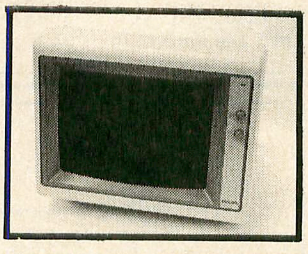

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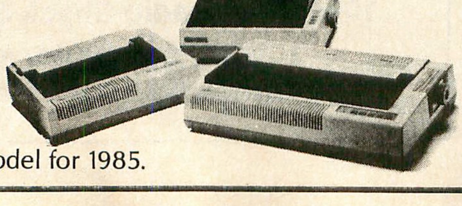

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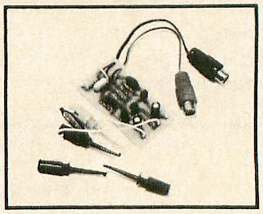

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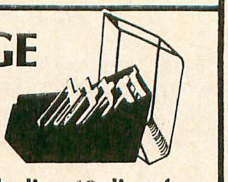

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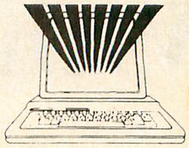

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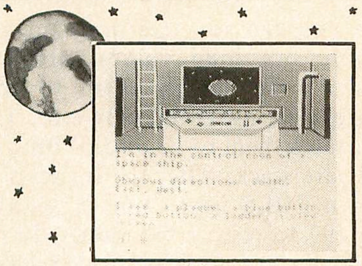

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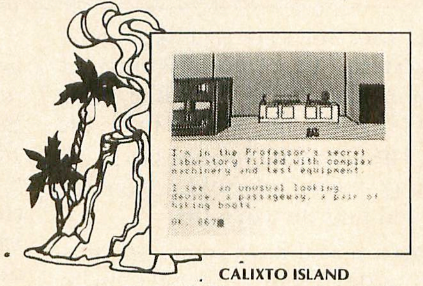

```
I'm in the Professor's secret
laboratory filled with complex
machinery and test equipment.

I see: an unusual looking
device, a passageway, a pair of
hiking boots.

OK, 867
```

CALIXTO ISLAND

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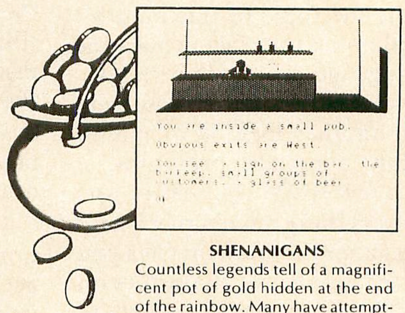

```
You are inside a small pub.

Obvious exits are West.

You see: a sign on the bar, the
barkeep, small groups of
customers, a glass of beer
```

SHENANIGANS

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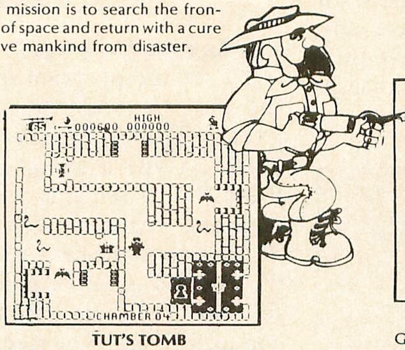

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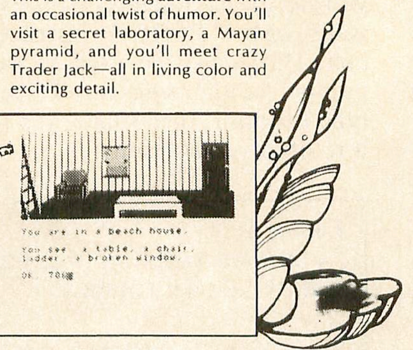

```
You are in a beach house.

You see: a table, a chair,
ladder, a broken window.

OK, 781
```

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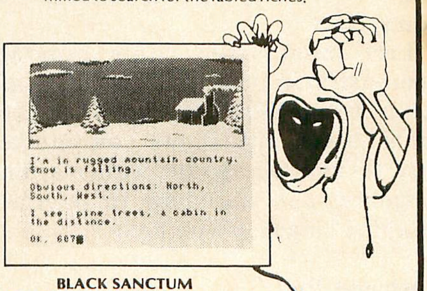

```
I'm in rugged mountain country.
Snow is falling.

Obvious directions: North,
South, West.

I see: pine trees, a cabin in
the distance.

OK, 687
```

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BYTE MASTER

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Interfacing Machine Language With BASIC

By R. Bartly Betts
Rainbow Contributing Editor

While the topic of this month's column is interfacing machine language programs with BASIC, it covers other territory as well. Along with another method of initializing machine language programs, it introduces a few ROM routines to use.

Finally, everything is tied up in a neat machine language program that lets you type a selected number of characters on the screen. The characters you type are in reverse video but, when you press ENTER, they flip back to regular video and are stored in a string variable that you specify.

Last month the feature program demonstrated one way to interface BASIC to machine language. The program this month shows you another way to interface BASIC with machine language, and also how to interface machine language with BASIC.

Push and Pull

But first, some lessons. Two new instructions for you to learn are PSHS and PULS. PSHS (Push a Register on the Hardware Stack) is used like a good filing system. In effect, issuing an instruction like PSHS Y is like filing the sales figures for yoyos in a file drawer. The next time you need to know how many yoyos are sold, open the drawer and pull the yoyo file.

Likewise, if you have some information in Register Y and are afraid it might get lost or destroyed if you leave it there, you can file its contents on the hardware stack with a PSHS Y instruction. In fact, PSHS can be used to save any number of the registers. To test this, type Listing 1, then single-step through it to observe the results:

Listing 1: DEMO
(A demonstration of the PSHS and PULS instructions.)

```
00100 START    LDA      #9
00110          LDB      #8
00120          LDX      #7
00130          LDU      #6
00140          PSHS     A,B,X,U
00150          CLRA
00160          CLRB
00170          LDX#0
00180          LDU#0
00190          PULS     A,B,X,U
00200 DONE     SWI
00210          END
```

As you can see, this program does nothing but load values into four registers, then clears them to zero. Before clearing them, however, Line 140 causes them to be pushed onto the hardware stack. After the registers are clear, a PULS instruction is issued in Line 190 to restore the values. In this demonstration program, four registers are saved. PSHS can, however, save as many or as few registers as you wish, using only one PSHS instruction.

Reading the Registers

To see the program in action, enter the ZBUG mode by typing Z and ENTER. To begin single-stepping, type START, (type a comma after START). Press 'R' to see the condition of the registers. Register A contains the value '9'. To step to the next instruction, press the comma again. Again press 'R' to see the registers. Register A still contains '9' and Register B contains '8'.

Continue through the program by pressing the comma to advance. Examine the registers each time. You see the four registers A, B, X and U loaded with values. The subsequent PSHS instruction does not cause any change. Next, the registers are cleared. Finally the PULS instruction loads all the original values back into the four registers.

(R. Bartly Betts is currently a technical writer for Tandy Corp. and is a former news reporter and magazine editor. As the father of 10 children, computers are his escape from reality.)

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If you're among many readers of THE RAINBOW who file every issue, expecting someday to need a program or article contained within the magazine, past releases of RAINBOW ON TAPE are available — beginning with the April 1982 edition. (Please check this issue's Table of Contents for "Back Issue Information" to review previous magazine themes.)

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August 1984 — *M*A*S*H*, a trivia quiz about the hit TV series; *The Trip*, a graphics Adventure game played with joystick; *The Jungle*, a safari challenge; *Sopwith CoCo*, a flight simulation for would-be pilots; *Dragon's Gold*, in which you must climb the ladder to success; *Key Bombers*, a game/tutorial for improving typing skills. Also: utilities for checking the speed of your disk drives/and backing up disk programs on cassette. Plus, a variety of other games and utilities.

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When using the PSHS and PULS instructions, remember that you must keep track of the order in which registers are loaded onto the stack. The stack operates in a "last in, first out" manner. Therefore, if you push the value in Register Y onto the stack, followed by the value in Register X, a PULS Y instruction does not load Y's original value back into Y, it loads the value from X.

Relating to ROM

Last month I discussed writing to the text screen by storing character values directly into the screen memory. This column introduces you to a different approach.

> ***"A great many ROM routines are available for you to use from machine language. All you need to know is what they do and where they are."***

In BASIC, characters are displayed on the video screen by a subroutine in ROM (Read Only Memory). ROM has hundreds of routines that BASIC uses to do its work. For instance, there are routines to turn on your cassette recorder or disk drives. There are routines to do arithmetic. There are routines to read key presses when you type, and there are routines to display characters on the screen. A great many ROM routines are available for you to use from machine language. All you need to know is what they do and where they are.

Listing 2 makes use of two of these subroutines to 1) get a keypress and 2) display the generated character on the video screen. It also introduces you to the `USR` method of interfacing to BASIC.

The origin of this program is set to $E00 to be compatible with all computers. The next instruction, in Line 110, jumps to a ROM subroutine that loads Register D with the value of the argument, or parameter, included in the BASIC `USR` command. For instance, if you issue the command `A=USR0(101)`,

Listing 2: `SCRNTYPE`

(A program to read keyboard input and display it on the screen. The location for the display is controlled by the `USR` function.)

```
                         00010 *************************
                         00020 *     SCREEN TYPE       *
                         00030 * BY R. BARTLY BETTS *
                         00040 *************************
                         00050 *
                         00060 *
0E00                     00100            ORG     $E00
0E00 BD      B3ED        00110 START      JSR     $B3ED
0E03 C3      0400        00120            ADDD    #1024
0E06 1F      01          00130            TFR     D,X
0E08 BD      A1C1        00140 GKEY       JSR     $A1C1
0E0B 27      FB          00150            BEQ     GKEY
0E0D 81      20          00160            CMPA    #32
0E0F 27      0C          00170            BEQ     SPACE
0E11 81      08          00180            CMPA    #8
0E13 27      0E          00190            BEQ     BACK
0E15 81      0D          00200            CMPA    #13
0E17 27      12          00210            BEQ     DONE
0E19 A7      80          00220            STA     ,X+
0E1B 20      EB          00230            BRA     GKEY
0E1D 86      60          00240 SPACE      LDA     #96
0E1F A7      80          00250            STA     ,X+
0E21 20      E5          00260            BRA     GKEY
0E23 30      1F          00270 BACK       LEAX    -1,X
0E25 86      60          00280            LDA     #96
0E27 A7      84          00290            STA     ,X
0E29 20      DD          00300            BRA     GKEY
0E2B 39                  00310 DONE       RTS
             0000        00320            END

0000 TOTAL ERRORS
```

Line 110 stores the value 101 in the 'D' register. Therefore, in the case of this program, the characters you type begin at screen location 101.

Line 120 of the program adds 1024 to the value now stored in Register D. This is because the text screen memory begins at 1024. When this value is added to the screen location value you set in the `USR` command, the result is the proper screen memory location. The new value of 'D' is then transferred to Register X for safe keeping.

A second ROM routine is used in Line 140. Here, the routine at $A1C1 is used to capture the keys you type. It stores your keystrokes in Register A. Routine $A1C1 does not produce a cursor when you type. I have used the label GKEY to mark the beginning of the routine that handles the character you type. Here is how the routin works:

- Line 150 compares a keystrok stored in Register A to a value o zero. Zero in Register A means tha no key is pressed and the routin loops back to check again.
- Line 160 compares the keystrok to a space (you pressed the spac bar). If it is a space, Line 17 branches to a routine to display space (character 96). The norma character 32 (generated when yo press the space bar) causes a blac block to appear on the screen whe stored in text screen memory.
- Line 180 compares the keystrok to a backspace (character 8). If yo press a backspace, Line 19

YOU should be here . . .

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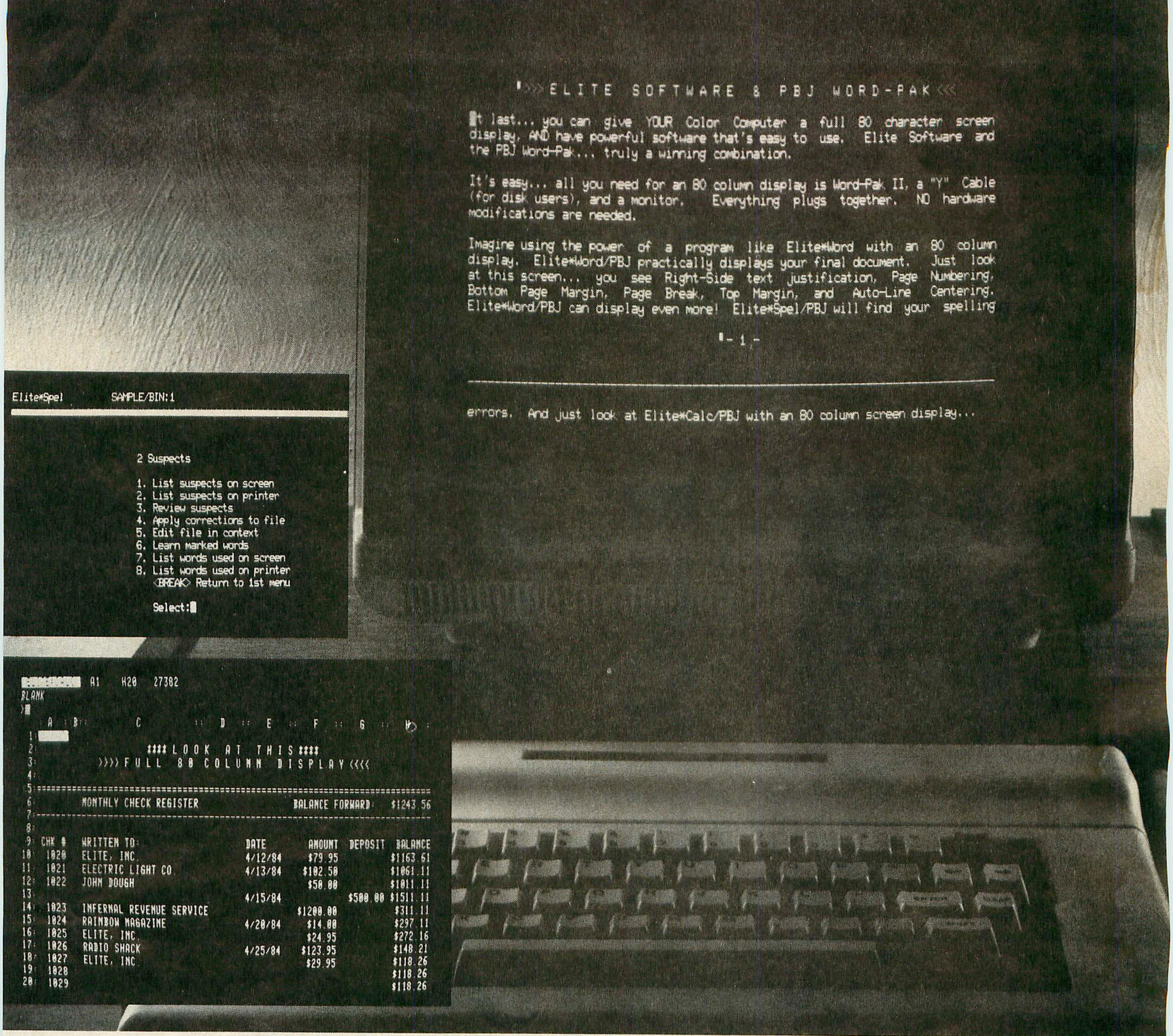

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                                 - 1 -

______________________________________________________________________________

errors.  And just look at Elite*Calc/PBJ with an 80 column screen display...
```

```
Elite*Spel        SAMPLE/BIN:1
____________________________________

                  2 Suspects

                  1. List suspects on screen
                  2. List suspects on printer
                  3. Review suspects
                  4. Apply corrections to file
                  5. Edit file in context
                  6. Learn marked words
                  7. List words used on screen
                  8. List words used on printer
                     <BREAK> Return to 1st menu

                     Select:
```

```
          A1    H20   27382
BLANK
>
    A  B        C         D    E     F     G     H
 1
 2              ****L O O K   A T   T H I S****
 3          >>>>F U L L   8 0  C O L U M N   D I S P L A Y<<<<
 4
 5 ==========================================================================
 6        MONTHLY CHECK REGISTER                  BALANCE FORWARD:  $1243.56
 7 --------------------------------------------------------------------------
 8
 9  CHK #   WRITTEN TO:                 DATE     AMOUNT  DEPOSIT   BALANCE
10   1020   ELITE, INC.                4/12/84   $79.95            $1163.61
11   1021   ELECTRIC LIGHT CO          4/13/84  $102.50            $1061.11
12   1022   JOHN DOUGH                           $50.00            $1011.11
13                                     4/15/84           $500.00  $1511.11
14   1023   INFERNAL REVENUE SERVICE           $1200.00             $311.11
15   1024   RAINBOW MAGAZINE           4/20/84   $14.00             $297.11
16   1025   ELITE, INC.                          $24.95             $272.16
17   1026   RADIO SHACK                4/25/84  $123.95             $148.21
18   1027   ELITE, INC                           $29.95             $118.26
19   1028                                                           $118.26
20   1029                                                           $118.26
```

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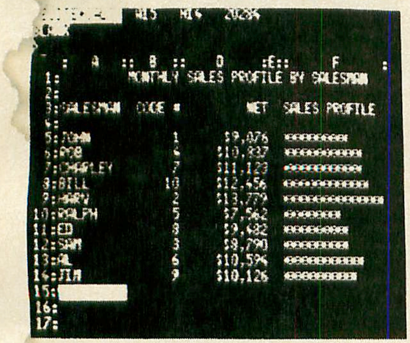
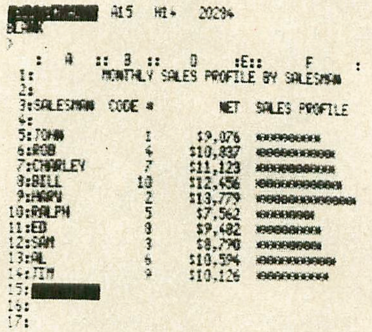


```
          A15    HI+    2029%

     :  A  :: B ::   D   :E::     F      :
  1:          MONTHLY SALES PROFILE BY SALESMAN
  2:
  3:SALESMAN  CODE #         NET  SALES PROFILE
  4:
  5:JOHN          1       $9,076  #########
  6:ROB           4      $10,837  ###########
  7:CHARLEY       7      $11,123  ###########
  8:BILL         10      $12,456  ############
  9:HARV          2      $13,779  ##############
 10:RALPH         5       $7,562  #######
 11:ED            8       $9,482  #########
 12:SAM           3       $8,790  #########
 13:AL            6      $10,594  ###########
 14:JIM           9      $10,126  ##########
 15:
 16:
 17:
```



```
          A15    HI+    2029%
BLANK
>
     :  A  :: B ::   D   :E::     F      :
  1:          MONTHLY SALES PROFILE BY SALESMAN
  2:
  3:SALESMAN  CODE #         NET  SALES PROFILE
  4:
  5:JOHN          1       $9,076  #########
  6:ROB           4      $10,837  ###########
  7:CHARLEY       7      $11,123  ###########
  8:BILL         10      $12,456  ############
  9:HARV          2      $13,779  ##############
 10:RALPH         5       $7,562  ########
 11:ED            8       $9,482  #########
 12:SAM           3       $8,790  #########
 13:AL            6      $10,594  ###########
 14:JIM           9      $10,126  ##########
 15:
 16:
 17:
```

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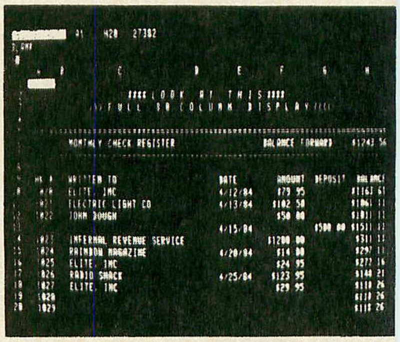

```
          A1    H20    27382
BLANK
      A  B        C            D      E       F       G       H

              #### L O O K   A T   T H I S ####
           >>> F U L L   8 0   C O L U M N   D I S P L A Y <<<

     MONTHLY CHECK REGISTER                       BALANCE FORWARD    $1243 56

      CK #   WRITTEN TO                  DATE       AMOUNT  DEPOSIT   BALANCE
      N/A    ELITE, INC                  4/12/84    $79 95            $1163 61
      1021   ELECTRIC LIGHT CO           4/13/84   $102 50            $1061 11
      1022   JOHN DOUGH                             $50 00            $1011 11
                                         4/15/84           $500 00    $1511 11
      1023   INFERNAL REVENUE SERVICE              $1200 00            $311 11
 15   1024   RAINBOW MAGAZINE            4/20/84    $14 00             $297 11
 16   1025   ELITE, INC                             $24 95             $272 16
 17   1026   RADIO SHACK                 4/25/84   $123 95             $148 21
 18   1027   ELITE, INC                             $29 95             $118 26
 19   1028                                                             $118 26
 20   1029                                                             $118 26
```

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branches to a routine that decreases Register X by one and stores 96 in place of the previously typed character, erasing it.

- Line 200 compares Register A to the value generated by a carriage return. If it is a carriage return, 210 causes the program to end.
- If you press a key, but it was not a carriage return, space or backspace, Line 220 stores the character value you typed into text screen memory at the location pointed to by Register X and increases Register X by one.
- Line 230 then causes the program to always branch back to the GKEY routine to look for the next keystroke.

> ***"When using the PSHS and PULS instructions, remember that you must keep track of the order in which registers are loaded onto the stack. The stack operates in a 'last in, first out' manner."***

You can see that using ROM routines is easy. A jump-to-subroutine instruction (JSR) is all that is required. Each ROM routine ends with a RTS (Return From Subroutine) instruction that causes it to return control to your program, beginning execution at the line following the JSR.

Joining Forces with BASIC

To use Listing 2 with BASIC, all you need are a few short lines that establish the beginning of the machine language routine and call it with a `USR` command that contains a valid argument. Listing 3 does this:

Listing 3: `INTRFACE`
(A BASIC program to interface the previous machine language program with BASIC.)

```
10 CLS
20 DEFUSR0=&HE00
30 A=USR0(101)
40 END
```

Listing 4: `REVTYPE`
(A program to display keyboard input on the screen in reverse video, then invert the characters when you press ENTER.)

```
                    00010 ************************
                    00020 *     REVERSE TYPE     *
                    00030 *   BY  CHRIS BONE     *
                    00040 ************************
                    00050 *
                    00060 *
7000                00100         ORG    $7000
7000 E6    84       00110 START   LDB    ,X
7002 10AE  02       00120         LDY    2,X
7005 34    20       00130         PSHS   Y
7007 9E    88       00140         LDX    $88
7009 BF    705F     00150         STX    BEGIN
700C 3A             00160         ABX
700D BF    705D     00170         STX    LENGTH
7010 BD    A1B1     00180 LOOP    JSR    $A1B1
7013 81    0D       00190         CMPA   #$0D
7015 27    2D       00200         BEQ    DONE
7017 81    20       00210         CMPA   #32
7019 25    0C       00220         BLO    CONTRL
701B 26    08       00230         BNE    FLIP
701D 9E    88       00240         LDX    $88
701F A7    80       00250         STA    ,X+
7021 9F    88       00260         STX    $88
7023 20    07       00270         BRA    CONTR0
7025 88    20       00280 FLIP    EORA   #$20
7027 BD    A30A     00290 CONTRL  JSR    $A30A
702A 9E    88       00300         LDX    $88
702C BC    705F     00310 CONTR0  CMPX   BEGIN
702F 24    07       00320         BHS    NOTBEF
7031 BE    705F     00330         LDX    BEGIN
7034 9F    88       00340         STX    $88
7036 20    D8       00350         BRA    LOOP
7038 BC    705D     00360 NOTBEF  CMPX   LENGTH
703B 25    D3       00370         BLO    LOOP
703D 86    08       00380         LDA    #$8
703F BD    A30A     00390         JSR    $A30A
7042 20    CC       00400         BRA    LOOP
7044 BE    705F     00410 DONE    LDX    BEGIN
7047 35    20       00420         PULS   Y
7049 A6    84       00430 DONELP  LDA    ,X
704B 88    40       00440         EORA   #$40
704D A7    80       00450         STA    ,X+
704F 81    60       00460         CMPA   #$60
7051 26    02       00470         BNE    NOTSPC
7053 86    20       00480         LDA    #$20
7055 A7    A0       00490 NOTSPC  STA    ,Y+
7057 BC    705D     00500         CMPX   LENGTH
705A 26    ED       00510         BNE    DONELP
705C 39             00520         RTS
705D                00530 LENGTH  RMB    2
705F                00540 BEGIN   RMB    2
           0000     00550         END
00000 TOTAL ERRORS
```

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Line 20 establishes the beginning of your machine language program with the `DEFUSR` statement. Line 30 calls the machine language program, passing it an argument of 101. Thus, when the program is run, the characters you type begin to appear at screen location 101.

To use the programs, simply `LOAD` them using the proper loading commands, type `RUN` and ENTER (because the machine language program is initialized by the BASIC program, you do not use the `EXEC` command). The screen clears and you can begin typing. To return to BASIC, press ENTER.

Type and Invert

Listing 4 uses some of the preceding features in a different way. The current cursor position establishes where the characters you type are displayed. The characters appear in reverse but, when you finish and press ENTER, they immediately invert to normal uppercase characters.

This program also uses two new ROM routines. The routine at $A1B1 is similar to the routine at $A1C1, except the normal cursor is on the screen as you type. The second routine at $A304 causes the characters typed to be displayed on the screen. This is the routine your computer uses in BASIC, and it replaces the STA instruction we used in the earlier program.

Listing 5 is commented to help you follow its logic. The following notes describe some of the key points:

- The RMB instructions in lines 530 and 540 set aside storage space that points to the beginning and end of the string.
- Memory location $88 stores the current screen cursor position.
- The ABX instruction adds the 'X' and 'B' registers. 'X' and 'B' are the only registers that allow this 16- and 8-bit addition.
- The subroutine at $A1B1 gets whatever key you press and stores it in Register A. This subroutine provides a normal cursor while waiting for a key press.
- The subroutine at $A30A displays the character currently in Register A on the screen at the current cursor position.
- If you are not familiar with the ASCII values of characters (used in lines 190, 210, 310, 360, 380, 460 and 500), there is an ASCII chart in your Color BASIC manuals.

Listing 6: `SAMPLE`
A BASIC program to show how *REVTYPE* can be used.)

```
10 CLS
20 CLEAR 1000,&H6FFF: REM change
 &H6FFF to &H3FFF for a 16K mach
ine
25 LOADM"REVTYPE: REM change LOA
DM to "CLOAD for a tape system
30 DEFUSR0=&H7000: REM change &H
7000 to &H3000 for a 16K machine
40 PRINT TAB(5) "COMPLETE THE SE
NTENCE
50 FOR T=1 TO 3
60 READ A$
70 S$(T)=A$
80 NEXT T
90 FOR T=1 TO 3
100 PRINT
110 PRINT S$(T)" ";
120 B$=USR0("
 ")
130 C$=S$(T)+" "+B$
140 PRINT
150 PRINT "this is what you wrot
e:"
160 PRINT C$
170 NEXT T
180 DATA ROSES ARE,MY BONNIE LIE
S,HOME IS WHERE THE
```

Listing 5: `CALLER`
(BASIC program to call the *Reverse Type* program. The number of spaces between the quotes in Line 120 establish the maximum number of characters you can type.)

```
10 DEFUSR0=&H7000
20 A$=USR0("        ")
3.0 END
```

Listing 6 is a sample of how the program might be handled from BASIC.

The program asks you to complete three sentences. The characters you type are in reverse video. When you complete your entry and press the ENTER key, the typed characters flip back to normal video. To show that the characters you type are stored in B$, Line 130 combines them with the partial sentence.

After using the program, `LIST` it. The last characters you typed are now part of the program and are displayed between the quotation marks in Line 120.

Forging Ahead

Now, put your imagination to work. Use some of the techniques you have learned to write programs of your own. You can, for instance, combine last month's program with the one for this month and create a program that lets you type characters in reverse video, flip them when you are through, then flash them.

You probably realize that you now have the knowledge to write a simple word processor, or create your own editing routine for a program.

You should feel that assembly language isn't too difficult. You should have the heady feeling of accomplishment that comes with realizing you are writing routines which could be used in full-fledged machine language games and utilities.

We have covered a lot of ground; now take your time and explore the new territory during the next month. It's a territory filled with more treasures. When you find some, write me, and we will share them with others. My address is 2251 Lipscomb, Fort Worth, TX 76110.

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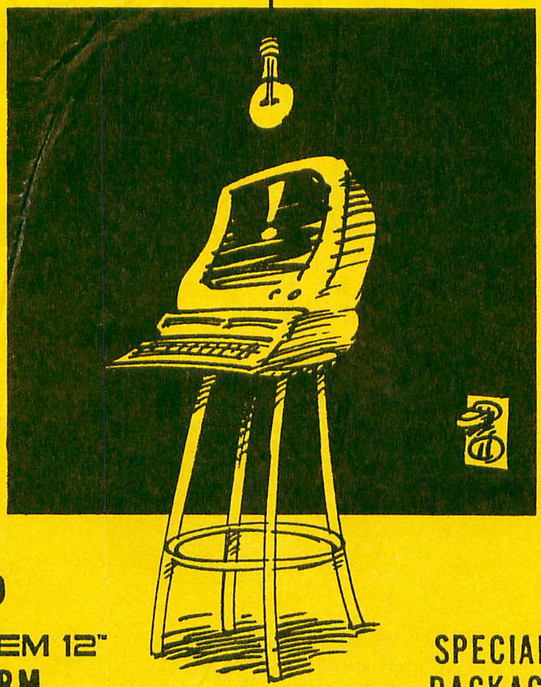

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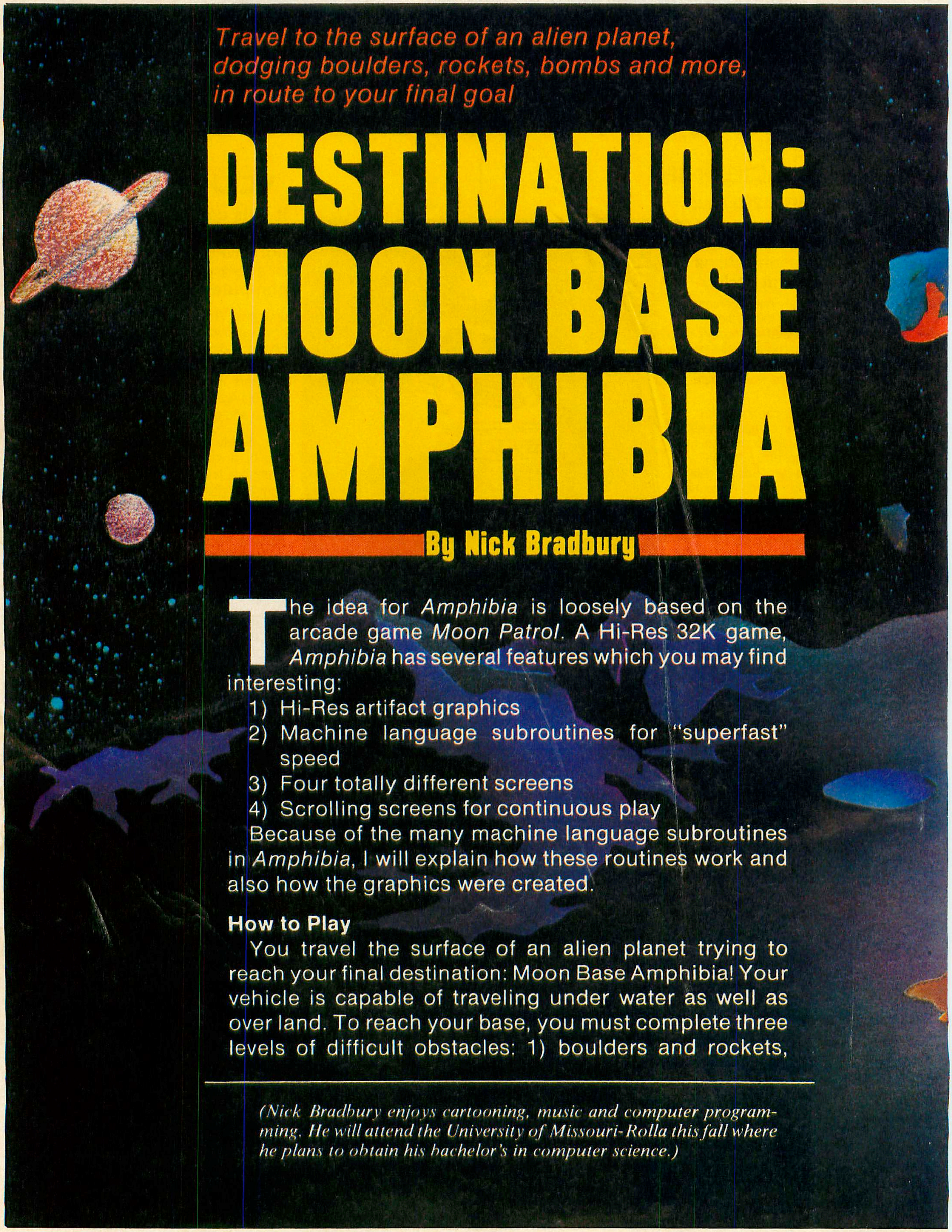

Travel to the surface of an alien planet, dodging boulders, rockets, bombs and more, in route to your final goal

DESTINATION: MOON BASE AMPHIBIA

By Nick Bradbury

The idea for *Amphibia* is loosely based on the arcade game *Moon Patrol*. A Hi-Res 32K game, *Amphibia* has several features which you may find interesting:

1) Hi-Res artifact graphics
2) Machine language subroutines for "superfast" speed
3) Four totally different screens
4) Scrolling screens for continuous play

Because of the many machine language subroutines in *Amphibia*, I will explain how these routines work and also how the graphics were created.

How to Play

You travel the surface of an alien planet trying to reach your final destination: Moon Base Amphibia! Your vehicle is capable of traveling under water as well as over land. To reach your base, you must complete three levels of difficult obstacles: 1) boulders and rockets,

---

(Nick Bradbury enjoys cartooning, music and computer programming. He will attend the University of Missouri-Rolla this fall where he plans to obtain his bachelor's in computer science.)

2) bombs and craters, and 3) geysers and surface rockets.

On each level, the right joystick controls your movements (you can only move left and right) and the firebutton controls jumps.

On Level one, you must jump over boulders while avoiding jumping up into the overhead rockets. Your timing must be perfect to jump over the boulders. After the timer runs out (at the bottom of the screen), you will go to the next screen.

In the second screen, you are under the alien ocean. Large craters appear and you must jump over them. Occasionally, undersea patrollers appear above you. You must avoid the bombs they drop and watch out for the craters the bombs leave when they hit the ocean floor.

After this screen, you will go on to level three. There are two obstacles you must avoid in this screen. The surface rockets appear to your left. These rockets pause for a moment, then unexpectedly shoot across the screen. You must jump over these rockets using split-second timing. Geysers will occasionally appear at the right of the screen. These are impossible to completely jump, but you must jump high enough so the water does not reach your cockpit.

After completion of these three screens, you will appear in front of the moon base. Above and below you are two revolving treadmills. The top treadmill is slowly coming down upon you, so you must act fast. To your right are two berserkers which you must avoid before you can reach your base. To reach your base, you must move your vehicle to the right. Upon completion of this screen, you will receive a bonus and will return to the first screen.

How to Create Graphics

The shapes in *Amphibia* are created in an extremely simple way. All shapes were originally drawn on graph paper. Because of Extended BASIC's `DRAW` command, this drawing can be easily translated into a draw string. For example, if a line on the graph paper moves right four spaces, I translate this to equal "R4." After the complete string has been created, I draw it the size I want using the powerful scale option of the `DRAW` command. The `PAINT` command was used to fill in the shapes.

The colors used in this game are the famous "artifact" colors that give different colors in `PMODE 4` using `SCREEN 1,1`. The best way I've found to use these colors is by using memory location 178. By changing the value in this location, the colors in the graphics commands are changed. By poking a 1 into this location, blue will show up. By painting in this mode with the format of `PAINT (x,y),,1`, the color blue will show up instead of white.

The ML Subroutines

The most important subroutine is the routine that copies an object onto the graphics screen. The other routines do the same action or scroll the background. I will only explain the copy routine, for I feel it is the most useful.

This routine (see accompanyin listing) uses less than 50 bytes. First draw the shapes onto pages five throug eight. The ML routine copies thes shapes onto a specified section of th viewing screen. The ROM routine a $B3ED (hexadecimal) is used to sen the location from the `USR` command t the ML routine. This ROM routin transfers the contents in between th `USR` brackets and places it into the 'D register. The ML routine takes thi location and places the shape in th desired memory location. You may us this routine in any of your programs.

Getting it Working

There are two problems you may fin in *Amphibia*. First, the artifact color may not turn out correctly. To solv this, you will see a cleared screen a the beginning of the program. If thi screen is a bluish color, press Reset an rerun the program until the colors ar correct. After a short pause, the scree will change and the program wil continue.

The other problem you may have i with the famous "speed-up" `POKE` tha is used. If you have problems with thi `POKE`, change the value of "PK" in Lin 0 to 65494. This will set the speed fo the entire program.

If you encounter any problems wit *Amphibia*, please write me and includ a full explanation of what went wrong Also, please include a self-addressed stamped envelope. I will write back a soon as possible. My address is 1050 Sandpiper Lane, Knoxville, TN 37922.

112	233	5255	218
410	33	6900	24
1016	104	7124	85
1218	60	7430	95
2000	179	7905	158
3052	69	8130	104
3162	234	8400	33
3316	218	8984	62
5050	151	9190	118
5175	128	END	128

Listing 1: `AMPHIBIA`

```
0 CLS0:CLEAR85,31000:PCLEAR8:DIM
A1(10):PK=65495:POKEPK,0:PMODE3,
1:PCLS3:PMODE4,1:SCREEN1,1:S1=0:
NS=4:PX=10:PY=12:GOSUB5000:GOSUB
2000:CLS:PRINT@32,Z$;:PRINT@448,
Z$;:PRINT@72,"a m p h i b i a":P
RINT@131,"(C)1983 BY NICK BRADBU
RY":PRINT@160,Z$;
20 SCREEN0,0:PMODE4,1:PCLS0:PMOD
E4,5:PCLS0:POKEPK,0:PRINT@224:PR
INT@256:PRINT@284:GOSUB1000:GOSU
B3000:DEFUSR0=31000:DEFUSR1=3105
0:DEFUSR2=31100:DEFUSR3=31150:DE
FUSR4=31200:DEFUSR5=31250:DEFUSR
8=31400:GOSUB6300:GOSUB6500:PLAY
"O3V30L255T255":POKE65494,0:
85 IFINKEY$=CHR$(13)THEN90ELSEPL
AY"FAAE":GOTO85
90 R1=0:R2=0:TI=0:POKEPK,0:BG=52
54:BX=5:E1=0:E2=0:PC=0:JP=0:U=US
R0(BG)
98 LV=1:PMODE4,1:COLOR1,0:SCREEN
1,1
100 J0=JOYSTK(0):IFJP=1THEN108EL
SEIFJ0<20THEN200ELSEIFJ0>43THEN2
25
108 PC=1-PC:U=USR0(BG):U=USR4(0)
```

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```
:IFPC=1THENEXEC31550
112 IFR1=1THENGOSUB405
120 IFJP=1THEN310ELSEIF(PEEK(&HF
F00)AND1)=0THEN300
124 IFPC=1THENBG=BG-32ELSEBG=BG+
32
130 U=USR4(0):U=USR3(0):IFR1=1TH
ENGOSUB405ELSEIFRND(15)=1THENGOS
UB400
144 IFR2=1THENGOSUB425ELSEIFRND(
26)=1THENGOSUB420
180 TI=TI+1:IFTI>8THENTI=0:GOSUB
6400
190 PLAY"O5V31P255":GOTO100
200 IFBX<1THEN108ELSEBX=BX-1:BG=
BG-1
205 U=USR1(BG+7):GOTO108
225 IFBX>16THEN108ELSEBX=BX+1:BG
=BG+1
230 U=USR1(BG-1):GOTO108
300 JP=1:J2=0:J1=0:PLAYP2$
310 IFJ2=1THEN320ELSEJ1=J1+1:IFJ
1>4THENJ2=1ELSEBG=BG-128
315 GOTO330
320 J1=J1-1:IFJ1<1THEN350ELSEBG=
BG+128
330 GOTO130
350 J2=0:JP=0:GOTO130
400 R1=1:E1=5755:U=USR5(E1):X1=2
9
405 P1=PEEK(E1+98):IFP1<>255THEN
910ELSEE1=E1-1:X1=X1-1:IFX1<1THE
N414
410 U=USR5(E1):RETURN
414 R1=0:I=480:U=USR1(E1-I):U=US
R1(E1-I+1):U=USR1(E1-I+2):U=USR1
(E1-I+3):U=USR1(E1-I+4):RETURN
420 R2=1:E2=4768:U=USR8(E2):X2=1
425 P1=PEEK(E2+258):IFP1<>42THEN
910ELSEE2=E2+1:X2=X2+1:IFX2>28TH
EN440
430 U=USR8(E2):RETURN
440 R2=0:FORI=0TO4:U=USR1(E2+I):
NEXTI:RETURN
910 PLAYPP$:NS=NS-1:CLS:SCREEN0:
PRINT@32,Z$;:PRINT@448,Z$;:PRINT
@99,"YOU HAVE"NS"BUGGIES LEFT.":
PRINT@163,"YOUR SCORE IS"S1"POIN
TS.":PMODE4,1:COLOR1,0:LINE(0,98
)-(255,150),PRESET,BF:FORX=0TO25
5:Y=143+RND(3):PSET(X,Y):PSET(X,
Y+1):NEXTX:PMODE4,1:COLOR1,0:
955 R1=0:JP=0:J2=0:PC=0:R2=0:GOS
UB6500:POKE65494,0:PRINT@387,"PR
ESS <ENTER> TO CONTINUE"
975 IFINKEY$=CHR$(13)THEN980ELSE
975
980 CLS:POKEPK,0:GOTO98
1000 PMODE3,1:COLOR4,1:LINE(0,0)
-(255,30),PSET,B:LINE(4,4)-(248,
26),PSET,B:PAINT(2,2),3,4:PMODE4
,1:COLOR1,0:FORX=0TO255:Y=143+RN
D(3):PSET(X,Y):PSET(X,Y+1):NEXTX
:POKE178,2:PAINT(128,190),,1:COL
OR1,0:Y=90:X1=256:FORX=0TO128:PS
ET(X,Y):PSET(X1,Y):PSET(X,Y+1)
1016 NEXTX:PMODE4,1:COLOR1,0:LIN
E(0,170)-(255,192),PRESET,BF:LIN
E(0,170)-(255,192),PSET,B:D1$="R
2F1E1R1D1F1D1L1G1H1D1L2H1G1L1H1L
1E1U1R1E1R1":PMODE4,1:DRAW"C1S16
BM44,58;XD1$;BM128,61;XD1$;BM212
,58;XD1$;":COLOR1,0:PAINT(60,60)
,,1:PAINT(130,64),,1:PAINT(214
1100 PMODE4,1:COLOR1,0:PCLS0:D1$
="E1U1F1R1F1":LINE(0,150)-(255,1
88),PSET,BF:FORX=6TO250STEP12:CI
RCLE(X,56),8,1:NEXTX:LINE(0,52)-
(255,70),PRESET,BF:LINE(251,51)-
(256,51),PSET:POKE178,1:PAINT(12
8,60),,1:COLOR1,0:PAINT(100,160)
,,1:PMODE4,1:COLOR1,0:PMODE4,1
1185 PMODE3,1:COLOR4,1:LINE(0,0)
-(255,30),PSET,B:LINE(4,4)-(248,
26),PSET,B:PAINT(2,2),3,4:PMODE4
,1:COLOR1,0:FORI=1TO30:PRESET(RN
D(255),161+RND(7)):NEXTI:RETURN
1200 PMODE4,1:COLOR1,0:PCLS0:PMO
DE3,1:COLOR3,1:LINE(0,156)-(255,
180),PSET,BF:PMODE4,1:COLOR1,0:F
ORI=1TO100:PRESET(RND(256),159+R
ND(8)):NEXTI:X1=256:COLOR1,0:Y=8
0:FORX=0TO128:PSET(X,Y):PSET(X,Y
+1):PSET(X1,Y):PSET(X1,Y+1):X1=X
1-1:Y=Y-2+RND(3):IFY<72THENY=7
1218 NEXTX:PMODE3,1:COLOR4,1:LIN
E(0,0)-(255,30),PSET,B:LINE(4,4)
-(248,26),PSET,B:PAINT(2,2),3,4:
PMODE4,1:COLOR1,0:D1$="R2F1E1R1D
1F1D1L1G1H1D1L2H1G1L1H1C1E1U1R1E
1R1":PMODE4,1:DRAW"C1S16BM36,40;
XD1$;BM110,44;XD1$;BM210,40;XD1$
;":PAINT(42,49),,1:PAINT(116,5
1280 PMODE4,1:COLOR1,0:LINE(0,17
0)-(255,192),PRESET,BF:LINE(0,17
0)-(255,192),PSET,B:POKE178,1:PA
INT(128,66),,1:RETURN
1300 PMODE4,1:COLOR1,0:PCLS0:LIN
E(0,170)-(255,192),PRESET,BF:LIN
E(0,170)-(255,192),PSET,B:PMODE3
,1:COLOR4,1:LINE(0,0)-(255,30),P
SET,B:LINE(4,4)-(248,26),PSET,B:
PAINT(2,2),3,4:PMODE4,1:COLOR1,0
:D1$="U4E2R1U4E1U2H1L1H1U1H1U1E1
U1E1R1E1U1E1D1F1E1U1F1D1F1R1F1
1340 LINE(0,31)-(255,48),PSET,BF
:LINE(0,162)-(255,169),PSET,BF:P
MODE4,1:COLOR1,0:CIRCLE(180,89),
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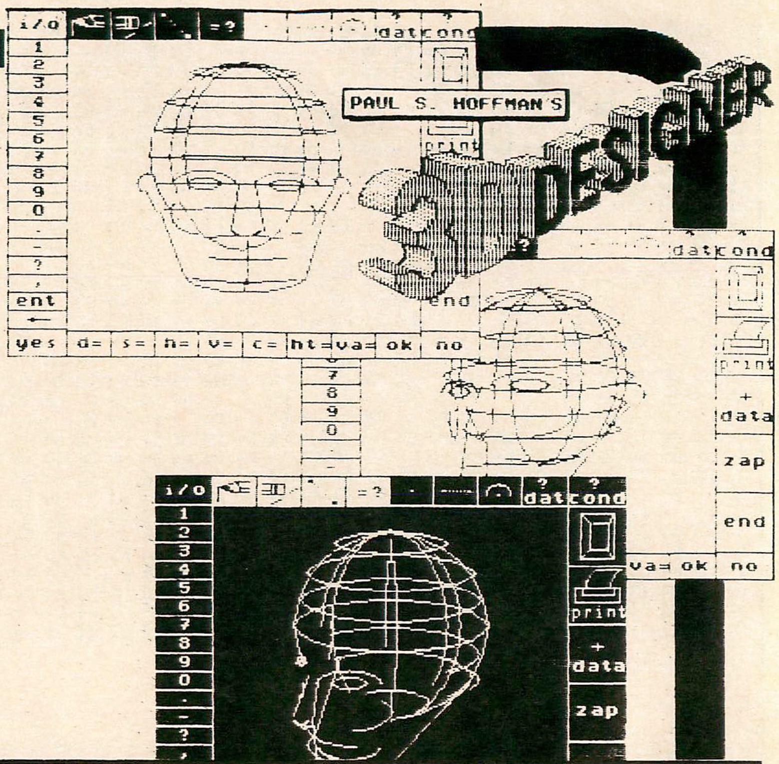

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```
10,1:POKE178,1:PAINT(180,115),,1
:COLOR1,0:RETURN
2000 P2$="O2V30L255T255DCGAFB":P
3$="O3V30L255T255FA":P4$="O1V30L
255T255AO2GO1A":P5$="O5V30L255T2
55EO3AO1G":PP$="O1V30L255T255FFA
FEAV25EGFADCEV20BGFEDAV15GFDACEV
10CBEGDDAV5FDEADV2GFEDA":Z$=STRI
NG$(32,"*")
2505 TM$="BM+3,0U6L3R6BR2BD6;BM+
5,-6L4R2D6L2R4BR3;BM+1,0U6R1F2D1
U1E2R1D6BR3;BM+5,0L4U6R4BD3BL2L1
BD3BR6;":RETURN
3000 PMODE4,5:D1$="E1R9NR2G1D2R4
U2NH1D3G1U1L2D1L3U1L2D1L1U1L2D1L
1H1U3":D2$="R2D1NL2D1L1NU2L1U2":
DD$="NL2R1D1R1H1F1D1L5U1E1":PMOD
E4,5:DRAW"C1S16BM34,92;XDD$;":PO
KE178,1:PAINT(32,97),,1:COLOR1,0
:CIRCLE(28,101),2,1:CIRCLE(39,10
1),2,1:GET(20,90)-(46,105),A1,
3010 DRAW"C1S16BM8,8;XD1$;":DRAW
"BM14,8;XD2$;BM22,8;XD2$;BM30,8;
XD2$;":POKE178,1:PAINT(40,21),,1
:COLOR1,0:CIRCLE(20,24),4,1:CIRC
LE(32,24),4,1:CIRCLE(52,24),4,1:
DRAW"C1S16BM8,42;XD1$;":DRAW"BM1
4,42;XD2$;BM22,42;XD2$;BM30,42;X
D2$;":POKE178,2:PAINT(40,55),,
3028 LINE(0,30)-(92,68),PSET,B:P
OKE178,1:PAINT(1,31),,1:PMODE3,5
:COLOR2,1:LINE(0,30)-(92,68),PSE
T,B:PMODE4,5:COLOR1,0:D3$="R1F1D
1F1L6U1E1R1E1":PMODE4,5:COLOR1,0
:DRAW"BM98,13;XD3$;":PAINT(98,20
),,1:LINE(92,21)-(94,23),PRESET:
LINE(92,21)-(95,18),PRESET:LIN
3052 LINE(140,14)-(150,22),PSET,
B:POKE178,2:PAINT(144,16),,1:COL
OR1,0:PMODE4,5:COLOR1,0:D5$="R8F
1L9U1":DRAW"C1S12BM215,16;XD5$;"
:PAINT(220,16),,1:PSET(243,19):P
MODE3,5:COLOR3,1:X=214:FORY=13TO
15:LINE(X,Y)-(X+12,Y),PSET:X=X+2
:NEXTY:X=222:FORY=19TO21:LINE(
3100 PMODE4,5:COLOR1,0:D1$="E1U1
E1R2F1D1R1E1R3E1R2E1U1H1R4G1D3F1
D3H1D3F1L4E1U1H1L2H1L3H1L1D1G1L2
H1U1H1":DRAW"C1S8BM102,48;XD1$;"
:CIRCLE(108,47),3,1:PAINT(126,47
),,1:PAINT(108,51),,1:PAINT(108,
43),,1:LINE(118,46)-(134,48),PRE
SET,B:COLOR3,1:FORX=120TO130ST
3142 PMODE4,5:DRAW"C1S8BM182,52;
XD2$;":POKE178,2:PAINT(188,52),,
1:COLOR1,0:DRAW"BM168,52;XD2$;":
```

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```
D1$="D4R12U4G2L1G1L1G1H1L1H2L1H1
":DRAW"C1S16BM208,50;XD1$;":PAIN
T(220,60),,1:PAINT(246,60),,1:PM
ODE4,5:COLOR1,0:LINE(94,33)-(256
,64),PSET,B:POKE178,1:PAINT(95
3162 PMODE4,5:COLOR1,0:LINE(254,
49)-(255,64),PSET,B:PMODE4,5:COL
OR1,0:D1$="R1E1U1F1R1F1R2E1R1E1F
1R1F1":D2$="E1U1H1L1G1U2E1R2F1E1
R2F1D2H1L1G1D1F1":PMODE4,5:DRAW"
C1S16BM12,101;XD1$;":LINE(12,102
)-(64,102),PSET:POKE178,2:PAINT(
50,100),,1:PAINT(26,100),,1:PM
3220 DRAW"C4S16BM29,98;XD2$;":PM
ODE4,5:POKE178,1:PAINT(36,88),,1
:PMODE3,5:PMODE4,5:DRAW"C1S16BM8
4,101;XD1$;":LINE(84,102)-(136,1
02),PSET:POKE178,2:PAINT(96,100)
,,1:PAINT(124,100),,1:PMODE3,5:C
OLOR3,1:LINE(84,102)-(136,102),P
SET:DRAW"C4S24BM98,98;XD2$;":P
3246 DRAW"S8BM34,92;XD2$;":COLOR
4,1:LINE(110,100)-(110,80),PSET:
LINE(106,100)-(106,80),PSET:LINE
(114,98)-(114,80),PSET:PMODE4,5:
COLOR1,0:D3$="E1R5F1R1F1R1F1L8E1
L3D1H1U1E1":DRAW"C1S12BM24,121;X
D3$;":PAINT(42,124),,1:D4$="U1E1
R2F2L5":D5$="G2R3E2L3":PMODE3,
3266 DRAW"BM28,124;XD5$;":PAINT(
28,128),3,3:LINE(32,130)-(10,130
),PRESET:COLOR2,1:FORX=40TO54STE
P4:PRESET(X,126):NEXTX:LINE(46,1
21)-(48,123),PSET,BF:PRESET(49,1
21):RETURN
3300 PMODE4,5:COLOR1,0:PCOPY5TO1
:PCLS0:PCOPY1TO5:LINE(0,29)-(255
,48),PRESET,BF:D1$="NU4ND4NL4NR4
":D2$="NE4NF4NG4NH4":LINE(0,42)-
(255,42),PSET:LINE(0,54)-(255,54
),PSET:LINE(0,40)-(255,40),PSET:
LINE(0,56)-(255,56),PSET:POKE178
,2:PAINT(100,55),,1:PAINT(100,
3316 LINE(0,62)-(255,62),PSET:LI
NE(0,74)-(255,74),PSET:LINE(0,60
)-(255,60),PSET:LINE(0,76)-(255,
76),PSET:POKE178,2:PAINT(128,61)
,,1:PAINT(128,75),,1:COLOR1,0:FO
RX=8TO256STEP16:CIRCLE(X,48),7,1
:CIRCLE(X,68),7,1:NEXTX:DRAW"C1S
4":FORX=8TO256STEP16:DRAW"BM"+
5000 ML$="BDB3ED1F0110 8E1E01C607
A6A0A7805A26F930881931A819108C21
872DEB39":TT=31000:GOSUB5500:ML$
="BDB3ED1F01108E1E08C601A6A0A780
5A26F930881F31A81F108C21882DEB39
":TT=31050:GOSUB5500:ML$="BDB3ED
1F01860 0C607A7805A26FB39":TT=311
00:GOSUB5500
5030 ML$="8E10011 08E1000A680A7A0
8C129F26F78E129F108E12BFA684A7A4
3088E031A8E08C0FFF26F139":TT=311
50:GOSUB5500:ML$="8E18011 08E1800
A680A7A08C18BF26F78E18BF108E18DF
A684A7A43088E031A8E08C17FF26F139
":TT=31200:GOSUB5500
5050 ML$="BDB3ED1F01108E1FAAC605
A6A0A7805A26F930881B31A81B108C21
2E2DEB39":TT=31250:GOSUB5500:ML$
="BDB3ED1F01108E1FB9C606A6A0A780
5A26F930881A31A81A108C20BE2DEB39
":TT=31400:GOSUB5500
5090 ML$="8E0CE1108E0CE0A680A7A0
8C0FDF26F78E0FDF108E0FFFA684A7A4
3088E031A8E08C0CFF26F139":TT=315
50:GOSUB5500:ML$="BDB3ED1F01108E
21C1C607A6A0A7805A26F930881931A8
19108C25C72DEB39":TT=31600:GOSUB
5500
5110 ML$="BDB3ED1F01108E2288C601
A6A0A7805A26F930881F31A81F108C26
682DEB39":TT=31650:GOSUB5500:ML$
="8E18C1108E18C0A680A7A08C1B1F26
F78E1B1F108E1B3FA684A7A43088E031
A8E08C18DF26F186FF8E1A20A7843088
E08C18A026F639":TT=31700:GOSUB55
00
```

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Oct. 11-13

RAINBOWfest

RAINBOWfest is the only computer show specifically dedicated to your Tandy Color Computer. Nowhere else will you see as many products, have immediate access to the top experts, or be able to attend free seminars of such import. It's the next best thing to receiving the latest issue of THE RAINBOW in your mailbox!

Every RAINBOWfest features many delightful surprises because it's a great opportunity for commercial programmers to show off many new and innovative products for the very first time. You get the jump on new capabilities for your CoCo. In exhibit after exhibit, there are demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

You can set your own pace between visiting exhibits and attending valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many of the persons who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer your questions, technical and otherwise. You also will meet lots of other persons, just like you, who share your interest in the Color Computer. It's a person-to-person event, as well as a tremendous learning experience, in a fun and relaxed atmosphere.

To make it easier for you to participate, we schedule RAINBOWfests in three parts of the country. If you missed the fun in Irvine, Calif., and Chicago, why don't you make plans now to join us in Princeton, N.J.? For members of the family who don't share your affinity for CoCo, you'll be comfortable knowing that RAINBOWfest is located in an area with many other attractions.

The Hyatt Regency — Princeton offers special rates ($65, single or double room) for RAINBOWfest. The show opens Friday evening with a 7 p.m. to 10 p.m. session. It's a daytime-only show Saturday — the CoCo Community Breakfast is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs continuously until 6 p.m. (There will be no exhibition hours or seminars Saturday evening.) On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

A well-known speaker again will keynote the highly popular CoCo Community Breakfast. These traditional gatherings allow you to catch up on significant happenings in the CoCo ommunity in an intimate etting.

When you attend other com- uter trade shows, you are ften disappointed. But you'll ove RAINBOWfest because it s the only major show com- letely dedicated to the Tandy olor Computer.

Tickets for RAINBOWfest ay be obtained directly from HE RAINBOW. We'll also send ou a special reservation form o you can get your special oom rate.

Come to RAINBOWfest! et's all celebrate the CoCo ommunity!

PCMfest Your admission to RAINBOWfest also entitles you to visit the premiere of PCMfest! It's a brand new show focusing on Tandy's new generation of computers — the Tandy MS-DOS computers and the Tandy Portables.

PCMfest is sponsored by our sister publication, PCM, *The Personal Computing Magazine for Tandy Computer Users*. The show will be in the same location as RAINBOWfest and the exhibit hours will be exactly the same. If you also use one of these Tandy computers, it's an opportunity you won't want to miss!

Show Schedule:

Friday evening — Exhibits open from 7 p.m. to 10 p.m.

Saturday — CoCo Community Breakfast at 8 a.m.
Exhibits open at 10 a.m. and close at 6 p.m.

Sunday — Exhibits open from 11 a.m. to 4 p.m.

RAINBOWfest/PCMfest —
Princeton, N.J.

Dates: October 11-13, 1985

Hotel: Hyatt Regency—Princeton

Rooms: $65 per night, single or double

Advance Ticket Deadline: October 4, 1985

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Signature ________________

ake checks payable to: The RAINBOW. Mail to: RAINBOWfest, the Falsoft Building, P.O. Box 385, rospect, KY 40059. To make reservations by phone, call: (502) 228-4492.

dvance ticket deadline: October 4, 1985. Orders received less than two weeks prior to show opening will be held for ou at the door. Tickets will also be available at the door at a slightly higher price.

```
5130 ML$="8E0C0108E0C00A680A7A0
8C0CDF26F78E0CDF108E0CFFA684A7A4
3088E031A8E08C0BDF26F139":TT=317
60:GOSUB5500:ML$="BDB3ED1F0108E
222CC607A6A0A7805A26F930881931A8
19108C25922DEB39":TT=31800:GOSUB
5500
5150 ML$="BDB3ED1F0108E2337C601
A6A0A7805A26F930881F31A81F108C25
172DEB39":TT=31850:GOSUB5500:ML$
="BDB3ED1F0108E2335C601A6A0A780
5A26F930881F31A81F108C25152DEB39
":TT=31900:GOSUB5500:ML$="BDB3ED
1F0108E23BAC606A6A0A7805A26F930
881A31A81A108C253E2DEB39"
5175 TT=31950:GOSUB5500:ML$="BDB
3ED1F0108E27A0C608A6A0AA84A7805
A26F730881831A818108C2BA72DE939"
:TT=32000:GOSUB5500:ML$="393939"
:TT=32050:GOSUB5500:ML$="8E0A811
08E0A80A680A7A08C123F26F78E123F1
08E125FA684A7A43088E031A8E08C0A9
F26F139":TT=32100:GOSUB5500
5210 ML$="8E0E8108E0E80A680A7A0
8C123F26F78E123F108E125FA684A7A4
3088E031A8E08C0E9F26F139":TT=321
50:GOSUB5500:ML$="8E19E108E19E0
A680A7A08C1B1F26F78E1B1F108E1B3F
A684A7A43088E031A8E08C19DF26F139
":TT=32200:GOSUB5500
5230 ML$="BDB3ED1F0108E26A1C609
A6A0A7805A26F930881731A817108C2A
C92DEB39":TT=32250:GOSUB5500:ML$
="BDB3ED1F0108E26AAC609A6A0A780
5A26F930881731A817108C2AD22DEB39
":TT=32300:GOSUB5500:ML$="BDB3ED
1F0108E26B2C609A6A0A7805A26F930
881731A817108C2ADB2DEB39"
5255 TT=32350:GOSUB5500:ML$="BDB
3ED1F0108E2BC1C607A6A0A7805A26F
930881931A819108C2EA72DEB39":TT=
32400:GOSUB5500:ML$="BDB3ED1F011
08E2300C60FA6A0A7805A26F9308811З
1A811108C252F2DEB39":TT=32450:GO
SUB5500
5280 ML$="BDB3ED1F0108E2580C60F
A6A0A7805A26F930881131A811108C27
6F2DEB39":TT=32500:GOSUB5500:ML$
="BDB3ED1F0108E1E71C602A6A0A780
5A26F930881E31A81E108C21F22DEB39
":TT=32550:GOSUB5500:RETURN
5500 FORI=1TOLEN(ML$)STEP2:AA$=M
ID$(ML$,I,2):AA=VAL("&H"+AA$):PO
KETT+VV,AA:VV=VV+1:NEXTI:VV=0:RE
TURN
6300 TM=0:PMODE3,1:COLOR3,1:TY=1
78:FORTX=40TO240STEP4:LINE(TX,TY
)-(TX,TY+6),PSET:TM=TM+1:NEXTTX:
PMODE4,1:DRAW"C1S4BM4,184;XTM$;"
:RETURN
6400 TX=TX-4:PMODE3,1:COLOR4,0:L
INE(TX,TY)-(TX,TY+6),PSET:S1=S1+
5:TM=TM-1:IFTM<1THEN6900
6425 PMODE4,1:COLOR1,0:PLAYP3$:R
ETURN
6500 PMODE4,1:COLOR1,0:IFNS<=0TH
EN20000
6504 LINE(8,7)-(240,24),PRESET,B
F:X=8:Y=8:FORI=1TONS:PUT(X,Y)-(X
+26,Y+15),A1,OR:X=X+26:NEXTI:RET
URN
6900 IFLV>1THEN7600ELSEPOKE65494
,0:POKE65314,170:PLAY"O1V30L255T
255FEO2A":POKE65314,255:FORI=1TO
200:NEXTI
6905 CLS:SCREEN0:PRINT@32,Z$;:PR
INT@448,Z$;:NS=NS+1:PRINT@96,"YO
U HAVE COMPLETED LEVEL ONE.":PRI
NT" BONUS 500!!!":S1=S1+500:PRIN
T:PRINT"YOUR SCORE NOW IS"S1".":
PRINT"YOU HAVE"NS"ROVERS LEFT.":
POKEPK,0:LV=2:PMODE4,1:COLOR1,0:
PCLS0:GOSUB6500:GOSUB1100:GOSU
7000 CLS:DEFUSR0=31600:DEFUSR1=3
1650:DEFUSR2=31700:DEFUSR3=31760
:DEFUSR4=31800:DEFUSR5=31850:DEF
USR6=31900:DEFUSR7=31950:POKE654
94,0:CLS:SCREEN0,0:PRINT@227,"PR
ESS <ENTER> TO CONTINUE"
7074 IFINKEY$<>CHR$(13)THEN7074
7090 BG=5287:BX=5:JP=0:PC=0:E1=0
:E2=0:E3=0:POKEPK,0:PMODE4,1:COL
OR1,0:SCREEN1,1
7100 J0=JOYSTK(0):IFJP=1THEN7108
ELSEIFJ0<20THEN7200ELSEIFJ0>43TH
EN7225
7108 PC=1-PC:IFE1=1THENGOSUB7410
7110 U=USR0(BG):U=USR2(0):U=USR3
(0):IFJP=1THEN7310ELSEIF(PEEK(&H
FF00)AND1)=0THEN7300
7124 IFE1=1THENGOSUB7410ELSEIFRN
D(24)=1THENGOSUB7400
7128 IFE2=1THENGOSUB7440
7130 U=USR2(0):ML=ML+1:IFML>8AND
E1=0THENIFRND(INT(TM/3))=1THENGO
SUB7500:ML=0
7140 IFPEEK(BG+1061)=85THEN7905
7180 TI=TI+1:IFTI>10THENTI=0:GOS
UB6400
7190 PLAY"O5V31P255":GOTO7100
7200 IFBX<1THEN7108ELSEBX=BX-1:B
G=BG-1
7205 U=USR1(BG+7):GOTO7108
7225 IFBX>16THEN7108ELSEBX=BX+1:
BG=BG+1
7230 U=USR1(BG-1):GOTO7108
7300 JP=1:J2=0:J1=0:PLAYP2$
7310 IFJ2=1THEN7320ELSEJ1=J1+1:I
```

```
FJ1>3THENJ2=1ELSEBG=BG-128
7315 GOTO7330
7320 J1=J1-1:IFJ1<1THEN7350ELSEB
G=BG+128
7330 GOTO7124
7350 J2=0:JP=0:GOTO7130
7400 E1=1:EP=3739:U=USR4(EP)
7410 EP=EP-1:IFEP<3711THEN7420EL
SEU=USR4(EP)
7412 IFE2=1THEN7415ELSEIFRND(18)
=1THEN7430
7415 RETURN
7420 E1=0:FORI=0TO6:U=USR1(EP+I)
:NEXTI:RETURN
7430 E2=1:EO=EP+514:PLAYP5$:EY=0
:U=USR5(EO)
7440 EY=EY+6:EO=EO+192:IFEY>42TH
EN7460
7445 IFPC=1THENU=USR5(EO) ELSEU=
USR6(EO)
7448 P1=PEEK(EO+512):IFP1<>85THE
N7905
7450 RETURN
7460 EI=EO+448:U=USR1(EO-448):E2
=0:GOSUB7505:PLAYP4$:RETURN
7500 EI=6299
7505 U=USR7(EI):RETURN
7600 IFLV>2THEN8600ELSEPOKE65494
,0:POKE65314,170:PLAY"O1V30L255T
255FEO4E":POKE65314,255:FORI=1TO
200:NEXTI
7605 NS=NS+1:S1=S1+1000:CLS:SCRE
EN0:PRINT@32,Z$;:PRINT@448,Z$;:P
RINT@96,"YOU HAVE COMPLETED LEVE
L TWO":PRINT" BONUS 1000!!!":PRI
NT:PRINT"YOU HAVE"NS"ROVERS LEFT
.":POKEPK,0:LV=3:PMODE4,1:COLOR1
,0:PCLS0:GOSUB6500:GOSUB1200:GOS
UB6300:GOTO8000
7905 POKE65494,0:PLAYPP$:CLS:SCR
EEN0,0:NS=NS-1:PRINT@32,Z$;:PRIN
T@448,Z$;:PRINT@99,"YOU HAVE"NS"
BUGGIES LEFT.":PRINT@163,"YOUR S
CORE IS"S1"POINTS.":PMODE3,1:COL
OR2,1:LINE(0,69)-(255,149),PSET,
BF:COLOR4,1:LINE(0,150)-(255,170
),PSET,BF:PMODE4,1:COLOR1,0:FO
7970 POKE65494,0:PRINT@387,"PRES
S <ENTER> TO CONTINUE"
7975 IFINKEY$=CHR$(13)THEN7980EL
SE7975
7980 CLS:POKEPK,0:GOTO7090:STOP
8000 CLS:DEFUSR0=31000:DEFUSR1=3
1050:DEFUSR2=32100:DEFUSR3=32150
:DEFUSR4=32200:DEFUSR5=32250:DEF
USR6=32300:DEFUSR7=32350:DEFUSR8
=32400:POKE65494,0:CLS:SCREEN0,0
:PRINT@227,"PRESS <ENTER> TO CON
TINUE"
8074 IFINKEY$<>CHR$(13)THEN8074
8090 JP=0:BG=5574:BX=5:CT=0:E1=0
:E2=0:F3=0:U=USR4(BG)
8098 PMODE4,1:COLOR1,0:SCREEN1,1
:POKEPK,0:GOSUB6500
8100 J0=JOYSTK(0):U=USR3(0):U=US
R4(0):IFPC=1THENU=USR2(0)
8104 IFJP=1THEN8108ELSEIFJ0<20TH
EN8200ELSEIFJ0>43THEN8225
8108 PC=1-PC:IFF3=1THENGOSUB8550
8110 U=USR0(BG):IFE1=1THENGOSUB8
410ELSEIFE2=1THENPE=PEEK(F2+485)
:IFPE<255THEN8910
8120 IFJP=1THEN8310ELSEIF(PEEK(&
HFF00)AND1)=0THEN8300
8130 U=USR4(0):CT=CT+1:IFCT<7THE
N8180
8135 IFE2=1THENGOSUB8510ELSEIFE1
=0ANDRND(20)=1THENGOSUB8500
8140 IFE2=1THEN8180ELSEIFE1=1THE
NGOSUB8410ELSEIFRND(20)=1THENGOS
UB8400
8180 PE=PEEK(BG+357):IFPE>0THEN8
910
8185 TI=TI+1:IFTI>9THENTI=0:GOSU
B6400
8190 PLAY"O3V31P255":GOTO8100
8200 IFBX<1THEN8108ELSEBX=BX-1:B
```

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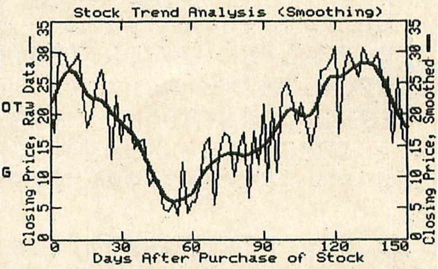

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```
G=BG-1
8205 U=USR1(BG+7):GOTO8108
8225 IFBX>16THEN8108ELSEBX=BX+1:
BG=BG+1
8230 U=USR1(BG-1):GOTO8108
8300 JP=1:J2=0:J1=0:PLAYP2$
8310 IFJ2=1THEN8320ELSEJ1=J1+1:I
FJ1>7THENJ2=1ELSEBG=BG-128
8315 GOTO8330
8320 J1=J1-1:IFJ1<1THEN8350ELSEB
G=BG+128
8330 GOTO8130
8350 J2=0:JP=0:GOTO8130
8400 E1=1:F1=5464:FX=27
8410 IFPC=1THEN8450ELSEU=USR5(F1
):F1=F1-1
8420 GOTO8480
8450 U=USR6(F1):F1=F1-1
8480 FX=FX-1:IFFX<1THENE1=0:U=US
R7(F1):POKE6528,170:CT=0
8490 RETURN
8500 E2=1:F2=5728:X2=2:FF=0:F3=0
8510 IFF3=1THEN8550ELSEFF=FF+RND
(3):IFFF>26THENFF=0:F3=1:GOTO855
0
8514 IFPC=1THENF2=F2-32ELSEF2=F2
+32
8530 U=USR8(F2):GOTO8580
8550 F2=F2+1:FF=FF+1:IFFF>27THEN
8590ELSEU=USR8(F2)
8580 RETURN
8590 E2=0:U=USR7(F2-416):CT=0:F3
=0:RETURN
8600 POKE65494,0:POKE65314,170:P
LAY"O1V30L255T255FEO2FEO3FEO4FEO
5FEO4FEO3FEFEFEF":POKE65314,255
8610 CLS:FORI=1TO200:NEXTI:SCREE
N0,0:PRINT@32,Z$;:PRINT@448,Z$;:
PRINT@96,"YOU HAVE COMPLETED LEV
EL THREE.":PRINT" BONUS 1500!!!"
:S1=S1+1500:PRINT:PRINT"YOUR SCO
RE IS NOW"S1"POINTS.":PRINT"YOU
WILL GO TO THE FINAL LEVEL":PRIN
T"WITH"NS"BUGGIES.":GOTO9000
8910 PLAYPP$:FORI=1TO200:NEXTI:S
CREEN0,0:CLS:PRINT@32,Z$;:PRINT@
448,Z$;:PRINT@98,"YOU HAVE"NS"BU
GGIES LEFT.":PRINT@164,"YOUR SCO
RE IS"S1".":PMODE4,1:COLOR1,0:LI
NE(0,88)-(255,155),PRESET,BF:NS=
NS-1:POKE65494,0:CLS:PRINT@227,"
PRESS <ENTER> TO CONTINUE"
8984 IFINKEY$<>CHR$(13)THEN8984
8990 CLS:JP=0:BG=5574:BX=5:CT=0:
E1=0:E2=0:F3=0:GOTO8098
9000 POKEPK,0:GOSUB3300:GOSUB130
0:GOSUB6300:GOSUB6500:DEFUSR0=31
000:DEFUSR1=31050:DEFUSR2=32450:
DEFUSR3=32500:DEFUSR4=32550:JP=0
:BG=5252:BX=3:RP=6176:E1=0:E2=0:
RQ=RP-3072
9098 PMODE4,1:COLOR1,0:SCREEN1,1
:EX=3183:E1=0:E2=0:EY=5583
9100 J0=JOYSTK(0):IFJ0<20THEN920
0ELSEIFJ0>43THEN9225
9108 PC=1-PC:U=USR0(BG):GOSUB940
0:IFPC=1THENU=USR2(RP):U=USR2(RQ
) ELSEU=USR3(RP):U=USR3(RQ)
9122 IFPC=1THENRQ=RQ+32
9180 PE=PEEK(BG+99):IFPE>0THEN99
00
9185 PE=PEEK(BG+101):IFPE>0THEN9
900
9190 PLAY"P255":GOTO9100
9200 IFBX<1THEN9108ELSEBX=BX-1:B
G=BG-1
9205 U=USR1(BG+7):GOTO9108
9225 IFBX>16THEN9108ELSEBX=BX+1:
BG=BG+1
9230 U=USR1(BG-1):IFBG=5261THEN9
500
9245 GOTO9108
9400 IFE1=1THEN9450
9410 EX=EX+192:U=USR4(EX):E2=E2+
1:IFE2>8THENE1=1
9430 GOTO9470
9450 EX=EX-192:U=USR4(EX):E2=E2-
```

TOTHIAN SOFTWARE

TEACHER PAK Four 16K Ext. BASIC programs. Make out grades (with or without weighting), statistical analysis of grades, alphabetize name lists, create seating charts. On tape but works with disk. 80-column printer helpful. $34.95

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All of these programs carry the Rainbow Seal.

```
1:IFE2<1THENE1=0
9470 IFE1=1THEN9485
9475 EY=EY-192:U=USR4(EY):RETURN
9485 IFE2<3THENU=USR4(EY) ELSEEY
=EY+192:U=USR4(EY)
9490 RETURN
9500 U=USR0(BG):POKE65314,170:PL
AY"V31L255T255DEFEDGDE":POKE6531
4,255:POKE65494,0:PLAY"O3V30L255
T255DEFFDEEDFADFADFADF":CLS:FORI
=1TO300:NEXTI:PRINT@32,Z$;:PRINT
@448,Z$;:PRINT@96,"CONGRATULATIO
NS!!!":PRINT"YOU HAVE MADE IT TO
":PRINT"MOON BASE AMPHIBIA!!!"
9590 GOTO20
9900 POKE65494,0:PLAYPP$:FORI=1T
O200:NEXTI:SCREEN0,0:CLS:PRINT@3
2,Z$;:PRINT@448,Z$;:PRINT@98,"YO
U HAVE"NS"BUGGIES LEFT.":PRINT@1
64,"YOUR SCORE IS"S1".":GOSUB130
0:JP=0:BG=5252:BX=3:RP=6176:E1=0
:E2=0:RQ=RP-3072:NS=NS-1:POKE654
94,0:CLS:PRINT@227,"PRESS <ENT
9984 IFINKEY$<>CHR$(13)THEN9984
9990 CLS:POKEPK,0:GOTO9098
20000 POKE65494,0:FORI=1TO200:NE
XTI:CLS:SCREEN0,0:PRINT@32,Z$;:P
RINT@448,Z$;:PRINT@128,"YOUR FIN
AL SCORE IS"S1:PRINT@352:INPUT"P
LAY AGAIN (Y/N)";A$:L$=LEFT$(A$,
1):IFL$="Y"THENRUN
```

Listing 2:

```
7918                00000           ORG  31000
                    00005 *THIS ROUTINE PUTS THE BUGGY GRAPHIC ON THE GRAPHIC SCREEN
                    00007 *AT THE LOCATION SPECIFIED THROUGH THE BASIC PROGRAM.
7918 BD   B3ED      00010 START     JSR  $B3ED       *GET PARAMETER FROM BASIC
791B 1F   01        00020           TFR  D,X         *STORE PARAMETER IN X
791D 108E 1E01      00030           LDY  #$1E01      *PUT LOCATION OF BUGGY GRAPHIC IN Y
7921 C6   07        00040           LDB  #7          *LENGTH IN BYTES OF GRAPHIC
7923 A6   A0        00050 LOOP1     LDA  ,Y+         *LOAD BYTE FROM BUGGY
7925 A7   80        00060           STA  ,X+         *PLACE BYTE ON SCREEN
7927 5A             00070           DECB             *COUNT
7928 26   F9        00080           BNE  LOOP1       *IF NOT ZERO, THEN GO BACK
792A 30   88 19     00090           LEAX $19,X       *NEXT LINE
792D 31   A8 19     00100           LEAY $19,Y       *NEXT LINE
7930 108C 2187      00110           CMPY #$2187      *END OF GRAPHIC?
7934 2D   ED        00120           BLT  LOOP1       *NO,RETURN
7936 39             00130           RTS
          0000      00140           END
00000 TOTAL ERRORS
```

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PIPELINE

UNIX TRAINING — OS-9 users wanting to learn more about the UNIX operating environment will be interested in a new series of UNIX Systems tutorials to be conducted by AT&T at the UNIX Expo, Sept. 18-20 in New York City.

A multi-level program composed of 20 sessions is designed to teach skills for job-specific applications and will include a series of laboratory courses to provide hands-on experience.

The exposition is expected to attract more than 200 leading manufacturers and vendors displaying the latest UNIX-based hardware, software and services. Write: Robert Birkfeld, National Expositions Co., 14 West 40th Street, New York, NY 10018.

FORTH AND GOAL — Cybertron Forth, an instructional package for the FORTH computer language, has been introduced by Cybertron, Inc.

The package includes software and tools for applications program development, along with a comprehensive educational manual on the language and full source listings.

FORTH is an advanced language used for real-time and control applications. It allows the addition of new words as a permanent extension of the language by letting the programmer use a new word or symbol to represent complex functions within the computer. Write: 30600 Solon Industrial Parkway, Solon, OH 44139.

SUNNY SUGAR — Sugar Software's move from Reynoldsburg, Ohio to Florida is now complete. Although the company continued to respond to customer orders within 24 hours of receipt, Susan Davis wants to pass along her apologies for any inconvenience experienced during the move.

Sugar's new address is: 1710 North 50th Ave., Hollywood, FL 33021. The telephone number is 305-981-1241.

NO, THANKS — The board of directors of H & R Block recently turned down a $72.5 million offer to purchase its subsidiary, the CompuServe Information Service, by a group headed by Jeffrey M. Wilkins, former chairman and chief executive officer of CompuServe.

During the past year Wilkins has made similar proposals to buy various segments of CompuServe, according to Henry W. Bloch, president of H & R Block. Wilkins was axed just prior to the offer and David C. Swaddling, CompuServe's chief financial officer, resigned.

Bloch said that since acquiring CompuServe in 1980, H & R Block has made direct investments totaling more than $20 million. "These strategic investments are beginning to pay off in accelerated earnings and revenue growth. We have every intention of continuing on this promising course," said Bloch.

CompuServe claims more than 200,000 personal computer subscribers. Unaudited pretax earnings for fiscal year 1985 were up approximately 50 percent.

DAILY NEWS — So much is happening so rapidly in the world of computers that Ziff-Davis Publishing Co. plans to introduce *Computer Industry Daily* this summer. The newspaper will cover the entire computer industry, including product announcements, internation developments, managerial change analyses and columns by well-know computer industry experts.

The publication will be targeted computer businesses, along with pr fessionals in businesses that serve th industry. Write: Ziff-Davis Publishin Co., One Park Avenue, New York, N 10016.

TAX HELP — If you claim time o your Color Computer as a busine expense on your personal income ta form, you may find the new Person Computer Usage Record helpful durin an audit.

It's a 4-by-6-inch logbook designe for logging your time on the compute Each page of the ledger is divided int columns which make it easy to recor the amount of time spent for person and/or business use. Write: Richard C Foley, 1440 Japaul Lane, San Jose, C 95132.

RS-232 PROTECTION — A "lightnin sponge" to protect devices remotel connected to a host computer by RS 232 cables has been introduced b Telebyte Technology.

The device is designed to accommo date lightning strikes on or near RS 232 cables and provide a low impedanc path to "earth" ground before they ca damage display terminals and compu ters. Write: 270 E. Pulaski Road Greenlawn, NY 11740.

SCREEN SHIELD — The Sentine VDT BodyGuard has been introduce by Packaging Industries Group. Con sisting of a superfine wire mesh protectiv shield which fits over a compute monitor, the BodyGuard is anti-glare anti-reflective and anti-static.

The maker also says that the shiel provides protection from low leve radiation and eliminates buildup o static electricity and possible resultin dust and potential skin problems Write: One Sentinel Plaza, Hyannis MA 02601.

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ower Kit Bd - Specify CoCoI/II**	$59.95
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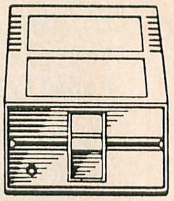

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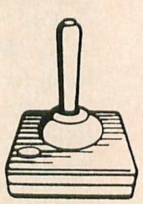

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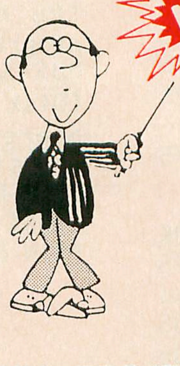

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16K
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CoCo, Phone Home

By Bill Bernico

Here's a nice little program to show your friends. It's called *Phone*, and upon running the program, a black desk phone appears and begins ringing. If you hit ENTER, you've answered the phone and your printed message appears on the screen along with your spoken message.

All you have to do is put this program on tape, and immediately after it, put your spoken message. Match the spoken message to the screen message for a finishing touch and you're done.

Now, call a friend into the room, run the program and let them answer it. By now you've had time to include them in your message. "Good morning, Mr. Phelps. Your mission, should you decide to accept it . . . "

Line	Description
20	128 Makes the phone black
	159= Yellow
	175 = Blue
	191 = Red
	207 = White
	223 = Cyan
	239 = Magenta
	255 = Orange
30-210	Draws the phone
220-310	Draws the phone cord
320-350	Puts number buttons on face of phone
360	Produces 10 rings
370	Creates ringing sound
380	Delay between rings
390	If ENTER is hit, phone is answered
410	Input your message here to match the spoken message on tape
420	Sends cassette message to TV speaker and turns on cassette motor

---

(Bill Bernico is a self-taught computerist who also enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wis.)

(If you have any questions regarding this program, Bill may be reached at 708 Michigan Avenue, Sheboygan, WI 53801, phone (414) 459-7350.)

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The best screen dump program for the Panasonic, Epson & Gemini printers ever! Have the option of standard or reverse images w/regular or double sized proportional pictures. 600-9600 Baud too! A must for Graphicom and Bjork Block users. 16K TAPE/DISK **$19.95** (see Nov '84 Rainbow Review)

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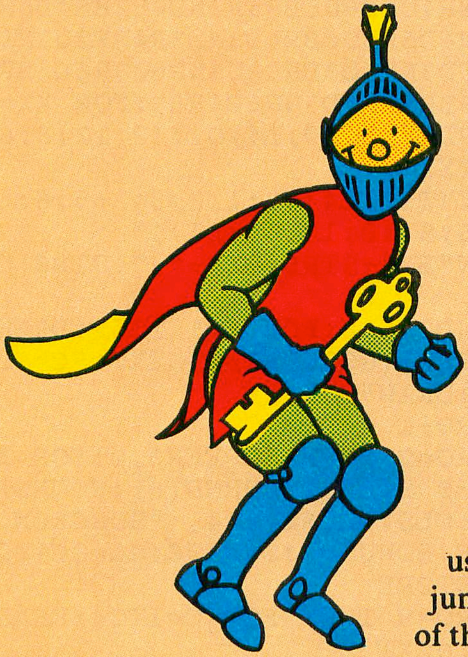
270 141
END 183

The listing: PHONE

```
10 CLS:PRINTTAB(4)"HIT ENTER TO
ANSWER PHONE
20 C=128
30 PRINT@38,STRING$(20,C)
40 PRINT@68,STRING$(24,C)
50 PRINT@98,STRING$(28,C)
60 PRINT@130,STRING$(5,C)
70 PRINT@138,STRING$(2,C)
80 PRINT@148,STRING$(2,C)
90 PRINT@153,STRING$(5,C)
100 PRINT@162,STRING$(5,C)
110 PRINT@170,STRING$(12,C)
120 PRINT@185,STRING$(5,C)
130 PRINT@202,STRING$(12,C)
140 PRINT@229,STRING$(22,C)
150 PRINT@261,STRING$(22,C)
160 PRINT@293,STRING$(22,C)
170 PRINT@325,STRING$(22,C)
180 PRINT@357,STRING$(22,C)
190 PRINT@389,STRING$(22,C)
200 PRINT@421,STRING$(22,C)
210 PRINT@453,STRING$(22,C)
220 PRINT@161,CHR$(137);
230 PRINT@193,CHR$(134);
240 PRINT@225,CHR$(137);
250 PRINT@257,CHR$(134);
260 PRINT@289,CHR$(137);
270 PRINT@321,CHR$(134);
280 PRINT@353,CHR$(137);
290 PRINT@385,CHR$(134);
300 PRINT@417,CHR$(137);
310 PRINT@449,CHR$(134);CHR$(137
);CHR$(134);CHR$(137);
320 POKE 1267,57:POKE1263,56:POK
E1259,55
330 POKE 1331,54:POKE 1327,53:PO
KE 1323,52
340 POKE 1395,51:POKE1391,50:POK
E1387,49
350 POKE 1459,35:POKE 1455,48:PO
KE 1451,42
360 FOR Y=1 TO 10
370 PLAY"V30L92O4AFAFAFAFAFAFAFA
FAFAFAFAFAFAFAFAFA
380 FOR X=1 TO 1300:NEXT X
390 IFINKEY$=CHR$(13)THEN 410
400 NEXT Y
410 CLS:PRINT"HELLO...PRINT YOUR
 MESSAGE HERE TO MATCH THE SPOKE
N MESSAGE ON  THE TAPE!
420 AUDIO ON:MOTOR ON
```

Sir Eggbert Jumper Leaps To The Rescue

By David Dawson



One terrible day a hole appeared in the ground in a small kingdom. Terrible creatures began to spring from it and ravage the countryside. Many knights descended into the pit but none returned.

Finally, Eggbert, a strange knight who never used weapons and had only his odd ability to jump like a rabbit, volunteered to rid the kingdom of the menace. The king was doubtful but desperate, so he agreed to send the young, peculiar knight.

Sir Eggbert Jumper is a one-player game similar to many "climb-up" games like *Donkey Kong* but with more of a "swords and sorcery" theme. There are eight dungeon screens included in Eggy's tasks (his friends call him Eggy), five of which are different. The last screen holds many surprises which you will have to play to see.

Game Play

The main objective for Eggy is to grab the yellow key and move, not jump, below the yellow door to exit the dungeon level. Be careful — jumping into the door could erase it and trap you on that level.

(David Dawson holds a master's degree in psychology and will be working towards his doctorate in the fall. He has a wife, Leigh Anne, and a son, Adam.)

Touching any red object will knock Eggy out. Touching yellow objects, except the key, will cause the screen to change color. While the colors remain abnormal it is not possible to jump off the level Eggy is on, but be careful not to step off the platform. The creatures cannot harm Eggy while they are not red, so use this time to get away from them.

Touching blue objects, and all objects while the colors are not normal, scores points.

A creature will appear if too much time is taken on a level. This creature leaves a permanent trail that may make it impossible to continue and effectively end the game. Be careful to finish quickly.

Joystick Operation

Move right or left by moving the joystick in the direction desired. If at any time Eggy's feet are not supported he will fall.

To jump up, press the joystick button while pressing the joystick forward. If the stick is also inclined to the right or left, Sir Eggbert will jump in that direction as well as up.

Jumping down is done the same way but the joystick must be pulled back. When jumping down it is critical that Eggy is near the edge of the platform upon attempt. If he is too far away from the edge he will try to jump up instead of down; on the other hand, if he steps off before he jumps he will fall to his death.

If a platform is above Eggy when h makes an upward jump he will bounc off the platform and, if a platform below him at the end of the jump, h will land safely. This could be used t jump over small breaks in the platfor on which Eggy is traveling or to avoi objects.

Use `PCLEAR2` and `ENTER` befo running the program. As a hint to wha waits on the last screen: The slogan o avid Eggy players is "Jump A Dragon

---

(For those having questions regardi this program, Mr. Dawson may contacted at 4808 Davenport, Apt. # Omaha, NE 68132.)

590	12
750	202
1130	152
1310	172
2000	67
4005	215
4420	187
4840	91
4960	223
END	56

The listing: EGGBERT

```
5 CLEAR100:PCLEAR2:PMODE1,1:PCLS
10 DIM H1(11,15):DIM H2(11,15):D
IM OJ(9,5):DIM C1(13,17):DIM C2(
13,15)
20 DRAW"C3BM20,120D2NR6D4R2NF4L2
D2L2D2L2BM106,120D2NL6D4L2NG4R2D
2R2D2R2"
30 FOR C=1TO8:READX,Y:PSET(X,Y,4
):NEXT:DATA 20,116,20,118,22,116
,22,118,104,116,104,118,106,116,
106,118
40 DRAW"C2BM36,90D4L2U2NU2R8D2"
50 COLOR4,1:LINE(86,58)-(98,72),
PSET,BF:PRESET(98,70):PRESET(98,
72):PRESET(98,58):PRESET(96,58):
PRESET(88,58):PRESET(88,60)
60 LINE(86,56)-(86,66),PRESET:LI
NE(92,68)-(98,70),PRESET,BF
70 PRESET(92,66):PRESET(90,66):P
SET(96,62,2):PSET(96,68,3)
80 GET(16,116)-(26,130),H1:GET(1
00,116)-(110,130),H2:GET(36,90)-
(44,94),OJ:GET(88,58)-(100,72),C
2
100 CLS:PRINT@128,"(C) 1982 BY D
AVID LIONELL DAWSON":PE=3
400 CL=0:KX=20:KY=168
405 IF RO=0 THEN 480
408 IF RO=8 THEN DRAW"BM40,80R4B
R3NU3D3BR4U6F6U6BR8F2ND4E2BR4D6R
6U6NL6BR4D6R6U6BR4D3ND3R4NF2U3NL
4BR12NR6D3NR6D3BR12U3NR6U3R6D6BR
4NR6U6R6BR4NR6D3NR6D4R6":FOR XX=
1 TO 3:PLAY "T10;L4;O1;12;12;8;8
;4":NEXTXX
409 PLAY"T10;L4;O3;1;3;5;3;5;6;6
;8;6;5;6;8;10;12;O4;L1;1"
410 DRAW"BM"+STR$(DX)+","+STR$(D
Y)
420 SOUND255,8:FOR X=1 TO52:DRAW
"S"+STR$(X):GOSUB8200:NEXT:SC=SC
+RO*100:DRAW"S4"
480 RO=RO+1
482 IF RO=9 THEN SCREEN0,0:FOR X
=1 TO 250 STEP6:CLSRND(8):SOUNDX
,1:NEXT:CLS:PRINT@224, "DUNGEON
COMPLETE,BONUS=";SC*100:SC=SC+SC
*100:RESTORE
485 IF RO=9 THEN FOR C=1TO4:READ
X,X,X,X:NEXT
500 IF RO=9 THEN RO=1
510 COLOR 3,1:PCLS
515 LINE(0,0)-(254,4),PSET,BF
520 ON RO GOSUB 4000,4200,4000,4
400,4200,4400,4600,4800
540 READ F:FOR C=1 TO F
550 READPX,PY:DRAW"BM"+STR$(PX)+
","+STR$(PY):GOSUB 8000
570 NEXT
590 READ F:FOR C=1 TO F
610 READ PX,PY:DRAW"BM"+STR$(PX)
+","+STR$(PY):GOSUB8100
630 NEXT
640 READDX,DY
650 DRAW"BM"+STR$(DX)+","+STR$(D
Y)
660 GOSUB 8200
670 READNO:IF NO=0 THEN 700
```

```
680 FOR C=1 TO NO
690 READ PX(C),PY(C)
695 NEXT
700 READ PX,PY:PUT(PX,PY)-(PX+8,
PY+4),OJ
710 DATA 2,140,92,140,184,2,230,
85,130,131,10,0,2,80,30,50,76,14
,82
720 DATA 3,10,46,170,46,60,92,2,
50,89,160,132,128,52,2,128,30,12
8,76,208,36
730 DATA 2,140,92,140,184,2,230,
85,130,131,10,0,2,80,30,50,76,14
,82
740 DATA 3,190,46,130,92,8,138,2
,10,37,170,129,45,0,6,100,122,20
0,76,10,76,50,30,100,30,160,30,2
38,82
750 DATA 3,10,46,170,46,60,92,2,
50,89,160,132,128,52,2,128,30,12
8,76,208,36
760 DATA 3,190,46,130,92,8,138,2
,10,37,170,129,45,0,6,100,122,20
0,76,10,76,50,30,100,30,160,30,2
38,82
770 DATA 4,40,138,74,92,130,92,1
0,92,1,110,85,90,98,1,180,122,20
,129
780 DATA 1,180,138,1,100,129,10,
54,0,240,175
785 CO=200-RO*10
1000 IF RO<3 THEN NO=0
1010 CNT=0:K=0:I=1
1020 HX=50:HY=168
1025 SCREEN 1,0
1030 LX=HX:LY=HY:EX=0
1031 CNT=CNT+1
1039 IF PPOINT(HX+5,HY+18)=7 THE
N 1100
1040 IF PPOINT(HX+5,HY+18)=3 THE
N 1100
1050 IF PPOINT(HX+5,HY+35)=3 OR
PPOINT(HX+5,HY+35)=7 THEN HY=HY+
17:GOTO1200 ELSE 3000
1100 X=JOYSTK(0):Y=JOYSTK(1):IF
X>40 THEN M=1 ELSE IF X<20 THEN
M=2 ELSE M=0
1110 IF Y<20 THEN U=1 ELSE IF Y>
40 THEN U=2 ELSE U=0
1120 IF PEEK(65280)=254 OR PEEK(
65280)=126 THEN 1130 ELSE 1190
1130 PLAY"T255;12;1":IF U=2 THEN
 IF PPOINT(HX+15,HY+18)=1 OR PPO
INT(HX-15,HY+18)=1 THEN HY=HY+46
:GOTO1190
1140 IF PPOINT(HX+5,HY-27)=1 THE
N HY=HY-46:EX=15:GOTO1190 ELSEHY
=HY-17:EX=15:GOTO1190
1190 IF M=0 THEN 1200 ELSE IF M=
1 THEN HX=HX+10+EX ELSE IF M=2 T
HEN HX=HX-10-EX
1200 IF HX>245 THEN HX=245 ELSE
IF HX<15 THEN HX=15
1210 LINE(LX-10,LY)-(LX+14,LY+14
),PRESET,BF:IF M=1 THEN PUT(HX,H
Y)-(HX+12,HY+14),H1 ELSE PUT(HX,
HY)-(HX+12,HY+14),H2
1220 IF K=1 THEN PUT(HX,HY)-(HX+
10,HY+6),OJ
1230 IF NO=0 THEN 1300
1240 X=RND(NO):LINE(PX(X)-4,PY(X
))-(PX(X)+16,PY(X)+14),PRESET,BF
1250 IF HX<PX(X) THEN PX(X)=PX(X
)-6 ELSE PX(X)=PX(X)+6
1260 PUT(PX(X),PY(X))-(PX(X)+12,
PY(X)+14),C1
1300 IF CNT<CO THEN 1400
1310 KX=KX+I*4:IF KX<10 THEN KY=
KY-46:I=1 ELSE IF KX>245 THEN KY
=KY-46:I=-1
1315 IF KY< 30 THEN KY=168
1320 PUT(KX,KY)-(KX+12,KY+14),C2
:CIRCLE(KX-2,KY+5),5,4,3
1400 IF K=0 THENIF RND(40)=1 THE
N PUT(PX,PY)-(PX+8,PY+4),OJ
1410 IF RO<>8 THEN 1450
1420 IF DF=0 THENDF=1: PX(1)=136
```

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```
:PY(1)=48 ELSE LINE(PX(1),PY(1))
-(PX(1)+12,PY(1)+14),PRESET,BF
1430 IF PX(1)<HX THEN PX(1)=PX(1
)+4 ELSE PX(1)=PX(1)-4
1435 PY(1)=PY(1)+RND(30)
1440 IF PPOINT(PX(1)-6,PY(1))<>1
 OR PY(1)>182 THEN DF=0:PLAY"T25
5;2;6;10" ELSE PUT(PX(1),PY(1))-
(PX(1)+12,PY(1)+14),C1
1450 IF PPOINT(HX-12,HY+8)=1 AND
 PPOINT(HX+12,HY+8)=1 THEN 2000
1455 IF PPOINT(HX-12,HY+8)=5 THE
N 2000
1460 IF PPOINT(HX-12,HY+8)=4 OR
PPOINT(HX+12,HY+8)=4 THEN 3200
1470 IF PPOINT(HX-12,HY+8)=2 OR
PPOINT(HX+12,HY+8)=2 THEN IF HX>
PX-13 AND HX<PX+18 AND HY<PY AND
 HY>PY-40 THEN K=1:PLAY"T1;O4;L1
6;12":GOTO1800 ELSE CL=CNT+50:SC
REEN 1,1:GOTO1800
1472 SC=SC+RO*10
1480 SOUND 250,1
1800 FOR X=12 TO1 STEP -2:PLAY"T
255;L16;O4;"+STR$(X):CIRCLE(HX,H
Y+6),X+10,2,.2:CIRCLE(HX,HY+6),X
+10,1,.2:NEXT
2000 IF CNT>CL THEN SCREEN 1,0
2005 IF K=1 AND PPOINT(HX+5,HY-1
2)=2 THEN 400
2010 GOTO 1030
3000 FOR X=HY TO 171:HY=X:LINE(H
X-5,HY)-(HX+10,HY-10),PRESET,BF:
PUT(HX,HY)-(HX+10,HY+14),H1:NEXT
3200 FORX=1TO10:SOUNDX,1:SCREEN1
,1:SCREEN1,0:NEXTX
3210 LINE(HX,HY)-(HX+10,HY+12),P
RESET,BF
3220 DRAW"BM"+STR$(HX)+","+STR$(
HY+16)+"H4R8NU6R8U2L2"
3225 SOUND100,10:SOUND1,20
3230 IF PE=1 THENSCREEN 0,0:CLS:
PRINT@160,"TRY AGAIN ADVENTURER!
":PRINT"YOU REACHED LEVEL";RO:PR
INT"SCORE WAS";SC:END ELSE PE=PE
-1:CLS:SCREEN 0,0: PRINT@160,"AD
VENTURERS REMAINING";PE:FORX=1TO
2000:NEXT:GOTO1010
4000 LINE(0,184)-(254,191),PSET,
BF
4005 LINE(0,0)-(254,2),PSET,BF
4010 LINE(0,138)-(208,144),PSET,
BF
4020 LINE(0,92)-(70,98),PSET,BF
4030 LINE(104,92)-(254,98),PSET,
BF
```

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```
4040 LINE(0,46)-(100,52),PSET,BF
4050 LINE(144,46)-(214,52),PSET,
BF
4060 LINE(208,46)-(214,92),PSET,
BF
4070 COLOR4,1:LINE(202,26)-(214,
40),PSET,BF:PRESET(214,26):PRESE
T(202,26):CIRCLE(208,32),5,2:PSE
T(208,32):LINE(204,38)-(212,38),
PRESET
4080 GET(202,26)-(214,40),C1:LIN
E(202,26)-(214,40),PRESET,BF
4100 RETURN
4200 LINE(0,184)-(254,191),PSET,
BF:LINE(0,138)-(96,144),PSET,BF
4210 LINE(128,138)-(216,144),PSE
T,BF:LINE(44,92)-(254,96),PSET,B
F
4220 LINE(0,46)-(96,52),PSET,BF:
LINE(128,46)-(228,52),PSET,BF
4230 COLOR4,1:CIRCLE(18,172),14,
4:PAINT(18,172),4,4:FOR X=1 TO 4
:PSET(RND(28),146+RND(12),4):NEX
T:LINE(10,158)-(28,165),PSET,BF
4240 RETURN
4400 LINE(0,184)-(254,191),PSET,
BF:LINE(0,138)-(44,144),PSET,BF
4410 LINE(154,138)-(230,144),PSE
T,BF:LINE(64,92)-(152,98),PSET,B
F
4420 LINE(202,92)-(254,98),PSET,
BF:LINE(0,46)-(64,52),PSET,BF:LI
NE(178,46)-(218,52),PSET,BF
4430 RETURN
4600 LINE(0,184)-(254,191),PSET,
BF
4610 LINE(0,138)-(204,144),PSET,
BF:LINE(0,92)-(28,98),PSET,BF:LI
NE(74,92)-(148,98),PSET,BF:COLOR
4,1:LINE(148,0)-(254,98),PSET,BF
:LINE(0,0)-(148,52),PSET,BF
4620 RETURN
4800 LINE(0,62)-(26,34),PSET:LIN
E-(44,56),PSET:LINE-(54,30),PSET
:LINE-(216,30),PSET:LINE-(222,52
),PSET:LINE-(240,28),PSET:LINE-(
244,60),PSET:LINE-(254,42),PSET
4810 PAINT(100,20),3,3
4820 COLOR 4,1
4830 LINE(76,0)-(70,14),PSET:LIN
E-(118,46),PSET:LINE-(94,16),PSE
T:LINE-(112,2),PSET:LINE-(130,22
),PSET:LINE-(138,30),PSET:LINE-(
138,40),PSET:LINE-(142,44),PSET:
LINE-(146,40),PSET:LINE-(148,30)
,PSET:LINE-(154,22),PSET
4840 LINE-(150,16),PSET:LINE-(14
2,12),PSET:LINE-(136,16),PSET:LI
NE-(130,22),PSET:LINE(156,22)-(1
78,4),PSET:LINE-(212,18),PSET:LI
NE-(202,46),PSET:LINE-(232,12),P
SET:LINE-(232,0),PSET
4850 PAINT(144,0),2,4:PAINT(144,
20),4,4
4870 LINE(120,10)-(122,28),PSET:
LINE-(136,34),PSET:LINE-(148,34)
,PSET:LINE-(162,28),PSET:LINE-(1
64,12),PSET
4880 PAINT(158,22),4,4:PAINT(128
,22),4,4
4885 CIRCLE(138,26),2,2,.5:CIRCL
E(148,26),2,2,.5
4890 PSET(138,24,3):PSET(138,26,
3):PSET(148,24,3):PSET(148,26,3)
:PSET(144,40,3):PSET(140,40,3)
4900 COLOR 2,1:LINE(142,12)-(134
,9),PSET:LINE(146,8)-(138,5),PSE
T:DRAW"C4BM128,32D8ND8R4ND8L8ND8
BM156,32D8ND8R4ND8L8D8"
4910 COLOR 3,1:LINE(0,92)-(162,9
8),PSET,BF
4920 LINE(0,184)-(254,191),PSET,
BF:LINE(62,138)-(128,144),PSET,B
F:LINE(178,138)-(200,144),PSET,B
F
4930 LINE(50,90)-(140,100),PRESE
T,BF
4950 CIRCLE(142,58),4,4:CIRCLE(1
42,58),1,2:COLOR4,1:LINE(146,56)
-(138,48),PSET
4960 GET(136,48)-(148,62),C1
4970 LINE(136,48)-(148,62),PRESE
T,BF
4980 RETURN
8000 DRAW"C3U10E4R4F4NL8D10":PAI
NT(PX+4,PY-3),3,3
8010 RETURN
8100 DRAW"C2NU8R8E4H4ND8L8G4F4"
8110 RETURN
8200 DRAW"C2NR20NL4D2NL4D2NL4D6N
L4D2NL4D2NL4D6R20U20":PAINT(DX+2
,DY+2),2,2
8205 DRAW"BM-14,+4C3R6D2L2ND4L4"
8210 RETURN
```

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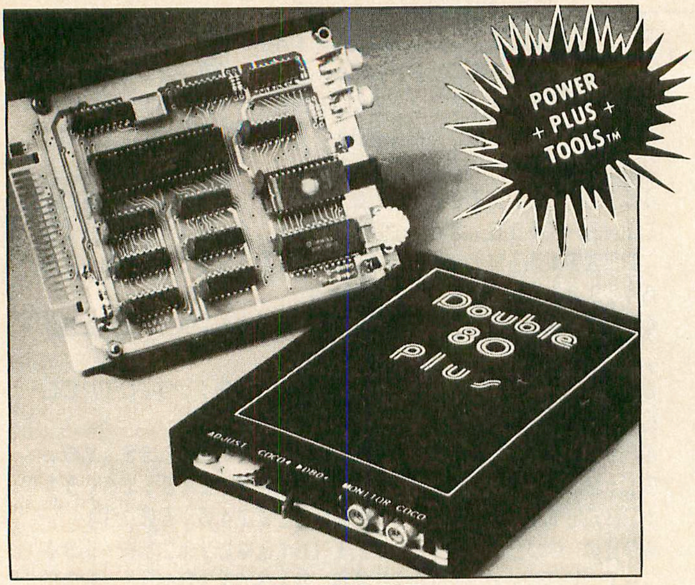

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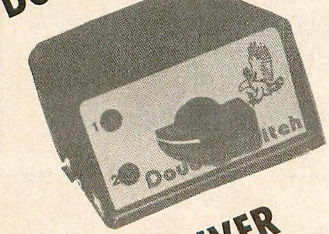
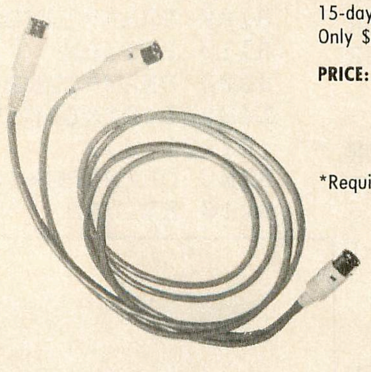


DOUBLE CABLE



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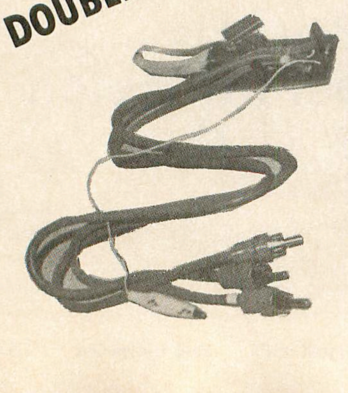

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- Trapping of incoming characters

BAUD Rates:
- 110-4800 (communicate)
- 600-9600 (printer)

Screen Format:
- 80 x 24 upper/lowercase
- Send all 128 characters from keyboard

Buffer:
- Merge text or programs
- 49K to 53K memory
- Four Buffer Send Modes
- Display Bytes Used/Remaining
- Editor—Move forward and reverse thru buffer. Insert, type over, delete lines characters or words. Block delete.

10 Macro keys
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BAUD Rates:
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- 600-9600 (printer)

Screen Format:
- 32 x 16, 42, 51, 64 or 85 x 24
- Send all 128 characters from keyboard

Buffer:
- Merge text or programs
- 49K to 53K memory
- Four Buffer Send Modes
- Display Bytes Used/Remaining
- Editor—Move forward and reverse thru buffer. Insert, type over, delete lines, characters or words. Block delete.

- 10 Macro keys
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- Send True Line Break
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SCHOOL IS IN THE HEART OF A CHILD **16K**

Play And Learn Together— Wonderment Is Contagious!

By Bob Albrecht and Ramon Zamor
Rainbow Contributing Editor

"School Is In The Heart Of A Child" is for parents of quite young children. We want to help you work and play with your 3- to 8-year-old child and learn to use computers as a joyful family experience. We suggest ways to use the home computer as another means to encourage your child's independence, growth and control over her own life. See the pride on her face as she directs the computer to do what she selects with deliberation. See her head gears switch to "on" as she progresses step by step with your presence and caring guidance. We will explore (we hope, with your help) the following:

- Specific "teaching" techniques so the discovery can be the child's own.
- Critical evaluation of software based on extensive playtesting in family and related environments.
- Additional resources to consult: books, magazines, software publishers, networks, etc.
- Suggestions for interludes and fun times away from the computer (a must!): call the librarian for information; watch TV together and discuss it; work together as volunteers in a community project; take an "awareness" walk.
- Whatever we learn from families we work with in Menlo Park or from you, our readers. Let's pool our knowledge and share our experiences as we learn from our children.

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(Well-known author Bob Albrecht co-authors the "Game Master's Apprentice" feature for THE RAINBOW *each month. Ramon Zamora is author and co-author of several books, co-founder of Computer Town USA!, and currently designing computer games for kids at Child Ware Corp. in Menlo Park, Calif.)*

Since you haven't said you want more Wandering Sta this time we will give you an assortment of program from *TRS-80 Color BASIC* by Bob Albrecht.

We begin with *Intergalactic Broadcasting*. We sugges you type it in using *your* name. Then, encourage your chil to change it to her or his name.

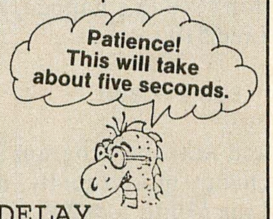
```
100 CLS
105 '
110 PRINT "INTERGALACTIC"
120 SOUND 89, 20
125 '
130 PRINT "BROADCASTING"
140 SOUND 125, 20
145 '
150 PRINT "COMPANY"
160 SOUND 147, 20
165 '
170 PRINT "BRINGS TO YOU..."
180 SOUND 176, 40
185 '
200 CLS
210 PRINT "LUCY ";
220 SOUND 89, 1
230 GOTO 210
```

Of course, you may wan to put *your* name in Line 210.

You see, the way to make a computer wonderful to a hild is to play with the child on the computer. Play gether, learn together. Wonderment is contagious!

We think your small child might like this one. Encourage im or her to type in his or her name.

```
100 REM**GRAND FINALE SCH 16-2
110 CLS
199 '
200 REM**FOR WHOM?
210 INPUT "YOUR NAME"; N$
299 '
300 REM**CRESCENDO FOR N$
310 CLS
320 FOR T=1 TO 255
330 : PRINT N$;
340 : SOUND T, 1
350 NEXT T
399 '
400 REM**LONG TIME DELAY
410 FOR K=1 TO 2500: NEXT K
499 '
500 REM**DO IT AGAIN
510 GOTO 110
```

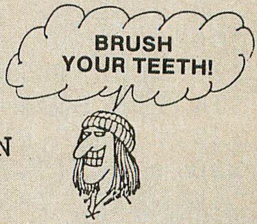

Patience! This will take about five seconds.

Almost every kid we know is on a team or has a friend n a team. So we suggest this program called *Go, Team, o!*

```
100 REM**GO TEAM GO! SCH 16-3
199 '
200 REM**'GO' ON A BLUE SCREEN
210 CLS 3: PRINT "GO";
220 GOSUB 910 <—— Use time delay subroutine
299 '
300 REM**'TEAM' ON ORANGE SCREEN
310 CLS 8: PRINT "TEAM";
320 GOSUB 910 <—— Use time delay subroutine
399 '
400 REM**'GO!' ON MAGENTA SCREEN
410 CLS 7: PRINT "GO!";
420 GOSUB 910 <—— Use time delay subroutine
430 GOSUB 910      twice for longer delay
499 '
500 REM**KEEP IT GOING
510 GOTO 210
599 '
600 REM**TIME DELAY SUBROUTINE
910 FOR K=1 TO 500: NEXT K
920 RETURN
```

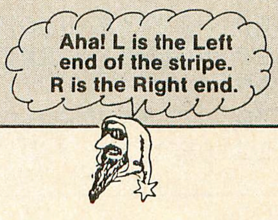
Adults love to kid adults. Kids love to kid adults. Adults ve to kid kids. And so on. Imagine this: You are the st one to go to bed tonight. Before you go, put a message n the screen for the early risers.

```
100 REM**MESSAGE BLINKER SCH 16-
4
199 '
200 REM**GET MESSAGE & PLACE
210 CLS
220 INPUT "YOUR MESSAGE"; M$
230 INPUT "WHERE SHALL I BLINK I
T"; P
299 '
300 REM**BLINK MESSAGE ON
310 CLS: PRINT @P, M$;
320 Z = 500
330 GOSUB 910
399 '
400 REM**BLINK MESSAGE OFF
410 CLS 2
420 Z = 300
430 GOSUB 910
499 '
500 REM**DO IT AGAIN
510 GOTO 310
599 '
900 REM**TIME DELAY SUBROUTINE
910 FOR K=1 TO Z: NEXT K
920 RETURN
```


BRUSH YOUR TEETH!

Can you figure out how to use the following program to paint many (or few) colored stripes on the screen?

```
100 REM**STRIPE 'PAINTBRUSH' SCH
 16-5
110 CLS 0
199 '
200 REM**DIALOG WITH PAINTER
210 PRINT @0, CHR$(30): PRINT @0
,;
220 INPUT "DOWN,L,R,CLR"; DOWN,
L, R, CLR
299 '
300 REM**PAINT HORIZONTAL STRIPE
310 FOR OVER=L TO R
320 : SET(OVER, DOWN, CLR)
330 NEXT OVER
399 '
400 REM**DONE. SOUND OFF.
410 SOUND 89, 10
499 '
500 REM**GO BACK FOR MORE
510 GOTO 210
```


Aha! L is the Left end of the stripe. R is the Right end.

The real wonderment of computers is to make them do what you want them to do. Everyone who reads this magazine can learn to read and understand CoCo BASIC programs, if only the people who write for the magazine have compassion for you, the beginner. If you learn to read and understand BASIC programs written by others, you will soon learn to express yourself in the language built in to every home computer.

Now try to read and understand this program. Replace the DATA statements with locations of your stars.

```
100 REM**CONSTELLATION SCH 16-6
110 CLS 0
199 '
200 REM**NS IS NUMBER OF STARS
210 READ NS
299 '
300 REM**TURN ON NS STARS
310 FOR STAR=1 TO NS
320 : READ OVER, DOWN
330 : SET(OVER, DOWN, 8)
340 NEXT STAR
399 '
400 REM**DO NOTHING LOOP
410 GOTO 410
499 '
500 REM**STAR DATA
910 DATA 7
920 DATA  6, 12, 18, 10
930 DATA 26, 12, 34, 14
940 DATA 38, 20, 54, 20
950 DATA 56, 14
```

Color me orange

Values of OVER and DOWN for seven stars

A mandala is a symmetric pattern; nice to look at. A giant snowflake is beautifully symmetric about its center. Snowflakes are great mandalas but melt too soon. Use this program to put an ever changing mandala on the screen.

```
100 REM**MANDALA, EVER CHANGING
SCH 16-7
110 CLS 0
199 '
200 REM**HORIZONTAL & VERTICAL O
FFSET
210 H = RND(32) - 1
220 V = RND(16) - 1
299 '
300 REM**RANDOM COLOR
310 KOLOR = RND(8)
399 '
400 REM**TURN ON FOUR BLIPS
410 SET(31 - H, 15 - V, KOLOR)
```

```
420 SET(31 - H, 16 + V, KOLOR)
430 SET(32 + H, 15 - V, KOLOR)
440 SET(32 + H, 16 + V, KOLOR)
499 '
500 REM**DELAY, THEN DO MORE
510 Z = 10
520 FOR K=1 TO Z: NEXT K
530 GOTO 210
```

RUN the program. The computer turns on four ligh at a time, symmetric with the center of the screen. If yo don't see this happen, increase the time delay by changir Line 510 to:

```
510 Z = 500
```

and RUN the program again. If you want the mandala t change more rapidly, delete lines 510 and 520, or chang Line 510 to 510 Z = 1.

Experiment! Try these variations:

Variation 1: Change only Line 210, as follows:
210 H = RND(RND(32)) - 1
Variation 2: Change only Line 220, as follows:
220 V = RND(RND(16)) - 1
Variation 3: Change both lines 210 and 220, as follows:
210 H = RND(RND(32)) - 1
220 V = RND(RND(16)) - 1
Variation 4: Change either Line 210 or Line 220, or botl as follows:
210 H = RND(RND(RND(32))) - 1
220 V = RND(RND(RND(16))) - 1
Variation 5: Change either Line 210, or Line 220, or both
210 H = 32 - RND(RND(32))
220 V = 16 - RND(RND(16))
Variation 6: Change Line 310:
310 KOLOR = RND(RND(8))
Variation 7: Anything suggested by the above variations.

Experiment! The best variations are your variations.

Here is a simple number guessing game. The numbe of stars tells you how close you are to the CoCo's secre number. Can you guess the number in seven guesses (ever time)?

The listing: STARS

500 37
END 65

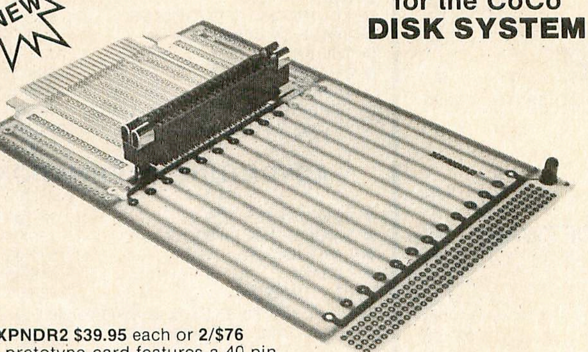
```
100 REM**STARS - A GUESSING GAME
 SCH 16-8
199 '
200 REM**TELL HOW TO PLAY
210 CLS
```

```
220 PRINT "WELCOME TO MY GALAXY.
 I'LL"
230 PRINT "THINK OF NUMBER, 1 TO
 100."
240 PRINT "YOU GUESS MY NUMBER.
IF YOU"
250 PRINT "MISS, I'LL PRINT SOME
 STARS."
260 PRINT "THE CLOSER YOU ARE, T
HE MORE"
270 PRINT "STARS YOU WILL SEE."
280 PRINT "IF YOU SEE 7 STARS (*
******),"
290 PRINT "YOU ARE VERY, VERY CL
OSE!"
299 '
300 REM**COCO 'THINKS' OF A NUMB
ER
310 X = RND(100)
399 '
400 REM**GET GUESS, G
410 PRINT @480,;
420 INPUT "YOUR GUESS"; G
499 '
```

```
500 REM**D IS DISTANCE FROM X
510 D = ABS(X - G)
599 '
600 REM**CHECK FOR A WIN
610 IF D=0  THEN 810
699 '
700 REM**NO WIN. PRINT HINT.
710 PRINT @464, "*";
720 IF D<64 THEN PRINT " *";
730 IF D<32 THEN PRINT " *";
740 IF D<16 THEN PRINT " *";
750 IF D<8  THEN PRINT " *";
760 IF D<4  THEN PRINT " *";
770 IF D<2  THEN PRINT " *";
780 PRINT: GOTO 410
799 '
800 REM**WINNER!
810 CLS
820 FOR K=1 TO 100
830 : PRINT @RND(510), "*";
840 NEXT K
850 PRINT @480, "YOU GOT IT, MY
NUMBER WAS" X
899 '
```

NEW

XPNDR2™
for the CoCo
DISK SYSTEM



XPNDR2 $39.95 each or **2/$76**
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```
900 REM**PLAY AGAIN?
910 PRINT "TO PLAY AGAIN, PRESS
ANY KEY"
920 IF INKEY$="" THEN 920 ELSE 2
10
```

lain and Fancy Patterns, the Easy Way

Our next number pattern program will generate any of e sequences shown in previous episodes, and lots more. ach sequence is defined by four numbers: 'S,' 'M,' 'A' ıd 'B.' 'S' is the first number in the pattern. To get the xt number:

1) Add 'A' to the preceding number
2) Multiply the result of Step 1 by 'M'
3) Add 'B' to the result of Step 2 in BASIC: `S = M*(S + A) + B`

The following table shows the values of 'S,' 'M,' 'A' and ' for some of our previous patterns.

Pattern	S	M	A	B
1,2,3,4, ...	1	1	1	0
2,5,8,11, ...	2	1	3	0
1,2,4,8, ...	1	2	0	0
11,111,1111, ...	11	10	0	1
32,332,3332, ...	32	10	1	2
34,334,3334, ...	34	10	−1	4

It's your turn. Show the values of 'S,' 'M,' 'A' and 'B' r each of the following patterns.

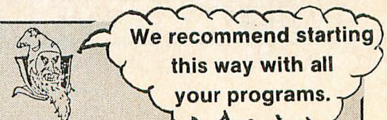
Pattern	S	M	A	B
2,4,6,8, ...				
1,3,5,7, ...				
1,10,100,1000, ...				
3,6,12,24, ...				
1,−2,4,−8, ...				
99,999,9999, ...				
43,433,4333, ...				
98,998,9998, ...				
37,337,3337, ...				
12,102,1002, ...				

Relax for a while. Do something physical. Jog, stretch, ance, play tennis. Then browse through our previous *umber Patterns* programs. Now, refreshed in mind and ɔdy, do the next exercise.

xercise

Write the program *Number Patterns* which generates atterns defined by 'S,' 'M,' 'A' and 'B.' Read their values om DATA statements. Write DATA statements for the atterns you want to see.

We will help you get started by showing an outline of ıe program using REM statements. All you have to do write the statements that follow each REM statement.


We recommend starting this way with all your programs.

```
100 REM**NUMBER PATTERNS
200 REM**READ STARTING NUMBERS
300 REM**SHOW 'LATEST' NUMBER
400 REM**COMPUTE NEXT NUMBER
500 REM**WHAT TO DO NEXT
900 REM**DATA: VALUES OF S,M,A,B
```

DragonSmoke

Our newsletter, *DragonSmoke*, is growing slowly. We began in January 1985 with two pages copied on our trusty Canon PC copy machine, then grew to eight pages in February, 16 in March, and 20 in April. Here are two ways to sample *DragonSmoke*.

copy machine, then grew to eight pages in February, 16 in March, and 20 in April. Here are two ways to sample *DragonSmoke*.

— Send $1 and we will send you the first four issues, January, February, March and April.

— Or, send $1 and ask for the latest issue. Our address: *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026.

DragonSmoke is a beginner's periodical covering computers, role playing games, play-by-mail games and tennis.

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CoCo, Can You Spare A Dime?

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget that this is* BASIC. *All programs resulting from your wishes are for your use but remain the property of the author.*

By now all of you should be familiar with the graphics power of your Color Computer. We have spent many articles in the past year reviewing different graphics techniques that will let you have fun with the graphics commands of Color Extended BASIC. We have drawn rock groups, baseball teams and even motion picture characters. What we have really *not* done until now is use any of this graphics magic for educational purposes. Our educational graphics have been limited to the CHR$ found in Color BASIC.

(Fred Scerbo is a special needs instructor for the North Adams Public Schools. He holds a master's in education and published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)

This month, we will remedy that with the *Color Change Quiz* written in 16K Color Extended BASIC. The program can be used to help instruct youngsters in the correct counting of coins, but best of all, it will do so using the kind of Hi-Res graphics you would expect from a program costing quite a bit of money.

Computer Graphics and Education

As computers get more and more sophisticated, we have come to expect a great deal from them as far as high resolution graphics are concerned. I remember when I first got the original 16K Color BASIC CoCo back in the spring of 1981 and how excited everyone got when I produced a low resolution character block map of Europe for my students. None of my students had ever seen anything remotely like it on a computer TV screen, and even though the image was rather rough, most of them got the idea of what I was trying to present.

However, when we wish to present something drawn on a computer screen in graphics today, we have much greater competition to deal with. Arcade games now explode with detailed color graphics. Can we seriously expect a student using an educational program on a computer to be satisfied with anythi less? Therefore, if we are going display or simulate something on o CoCo screen, we should be careful make it look as close to the object copies as possible.

Unfortunately, I have seen a numb of graphics programs which deal wi dollars and coins and do a very po job of displaying the currency. Can v expect students to make change in re life if a computer drills them in mon skills by using a circle with "25 cent written inside of it?

If we are going to draw a quarte then we should see good old Geor Washington right down to his pigta hairdo. Similarly, a dime should ha Roosevelt, a nickel should have Jeffe son and a penny should be copper-re with honest Abe Lincoln on it. Regre tably, I have yet to see any reasonab priced educational software offer th kind of detail. That's why I wrote *Col Change Quiz.*

The Wish

Since I have gotten many letters fro parents who like to use their CoCos fo math instruction with their youngster offering this program seemed to be th right idea at this time. Money handlin

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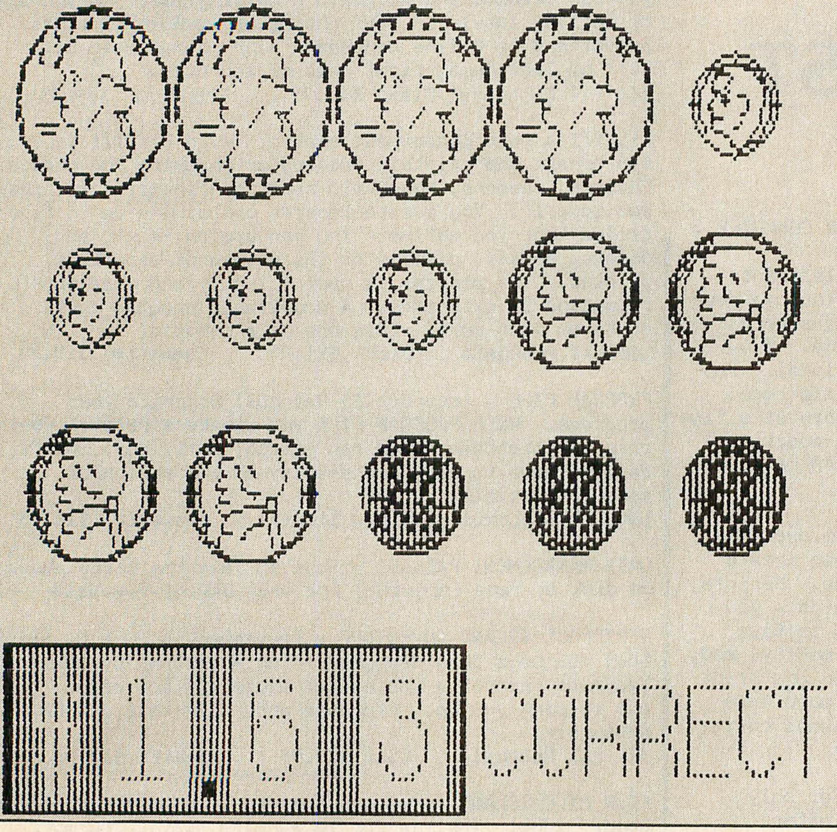
Sample Graphics



is a skill everyone needs to master order to survive, so having an easy- use program for the CoCo on t subject was a desirable wish for ma readers.

Other suggestions that have come included ways to have students ma the correct correlation between a digi clock and the type with two han These ideas slowly jell to form a w from month to month. In this case, t change skills seemed to be a good ro to follow.

The Program

Color Change Quiz starts off with c now typical title card using the CH blocks. I have found that these ma quick and colorful title screens becau they allow the use of a totally bla background. Since we have to inclu instructions or prompts to make t program run the way we wish, as w as our credits and copyright symbo staying in the text mode saves us t difficulty of redrawing our alphabet the graphics mode.

Also, `INPUT` statements would n work in graphics; we would have to u the `INKEY$` function instead. To put all into a nutshell: Why go to all th

One-Liner Contest Winner . . .

This "pixel-blaster" program loads any standard Hi-Res (`PMODE 4`) picture file from disk and then converts the whole picture to either red or cyan, depending on whether you select odd or even aliasing and the reset state of the CoCo. You can then re-save the file on disk.

For use with cassette systems, change `LOADM` to `CLOADM`, `SAVE` to `CSAVEM` and change the `SAVEM` addresses to `&H600,&H1DFF,&HA027`.

The listing:

```
0 CLS:INPUT"PICTURE";F$:INPUT"EV
EN (1) OR ODD (2) ALAISING";A:PM
ODE4,1:PCLS:SCREEN1,1:LOADMF$:FO
RI=A TO256STEP2:LINE(I,0)-(I,192
),PRESET:NEXT:FORD=1TO3000:NEXT:
INPUT"RESAVE IT (Y/N)";A$:CLS:IF
LEFT$(A$,1)="Y"THENSAVEM F$,&HE0
0,&H25FF,&HA027
```

Scott Bain
San Diego, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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rouble when the text mode will let us lo it attractively and efficiently? Case losed.

The actual coins in our program are imited to quarters, dimes, nickels and ennies. I have left out the half-dollar or two reasons: Few people use half-lollars nowadays, and drawing a half-lollar on the screen would take up too nuch space, allowing for the use of ewer coins on the screen at one time. Also, if I were to take up the space using half-dollar, the next logical step would e to draw a Susan B. Anthony dollar ince it is smaller than a half-dollar. The nain purpose of this program is to be unctional.

The coins are created using a combination of `DRAW` and `CIRCLE` commands. I have taken great pains to make he characters on the coins look as much ike the actual coins' figures as possible. I did not go into as much detail on he penny. You will see a shadowy mage of Lincoln, but you will have no lifficulty recognizing the coin as a enny.)

Each of the coin graphics is stored in a graphics array using the `GET` command. When we want to draw a given coin, we simply `PUT` the appropriate array where we want it. The selection of coins displayed is determined by a selection of random numbers.

Running the Program

When you run the program, you will be asked to select the number of coins to be displayed. The maximum number of coins is 15, but you can display as little as one coin. The screen will go blank and then display a title card asking you to select the red-colored letter. You must select either 'A' or 'B.' This determines our color-set and helps insure that our pennies are red, not blue.

Next, our screen will display our coins starting in the upper left-hand corner. The lower left-hand corner will show a box with three spaces ($0.00). Above the space farthest to the left will appear an arrow. Let's say the total for the coins on the screen is $.30; then the first digit you must enter is '0' for the dollar's place. It must be entered as $0.30 instead of $.30.

If at any point you enter an incorrect digit, pressing the backspace arrow will correct the error. When the final digit is entered, the screen will indicate if the answer was correct or wrong. If the answer is wrong, you may not continue until you enter the correct answer.

The program will keep displaying sets of coins for you to add until you press the '@' key. Then, a "scorecard" will appear with the number wrong, the number correct, your percentage and the prompt for trying again ('Y' or 'N'). That's all it takes to run the program.

Try *Color Change Quiz* if only to see the graphics it draws. You will find it is very useful to any youngster trying to learn about coin mathematics. Best of all, it will teach these skills in a way which graphically represents exactly how these coins appear in the real world. After all, isn't that what a computer program should do?

140	205
280	174
400	147
540	24
670	195
870	189
950	246
END	11

The listing: CHNGQUIZ

```
10 '******************************
20 '*     COLOR CHANGE QUIZ      *
30 '*     BY FRED B. SCERBO      *
40 '*    COPYRIGHT  (C) 1985     *
50 '* 149 BARBOUR ST.N.ADAMS,MA*
60 '******************************
70 SCREEN0,0:CLS0:FORI=0TO64STEP
32:FORY=1062TO1080:READA:POKEI+Y
,A+128:NEXTY,I
80 FORI=0TO64STEP32:FORY=1156TO1
179:READA:POKEI+Y,A+128:NEXTY,I:
FORI=0TO64STEP32:FORY=1256TO1270
:READA:POKEI+Y,A+128:NEXTY,I
90 DATA63,60,60,,63,60,63,,63,48
,48,,63,60,63,,63,60,63
100 DATA127,112,112,,127,112,127
,,127,112,112,,127,112,127,,127,
125,114
110 DATA44,44,44,,44,44,44,,44,4
4,44,,44,44,44,,44,32,44
120 DATA95,92,92,,95,80,95,,87,9
2,91,,95,91,80,95,,95,92,92,,95,
92,92
130 DATA95,80,80,,95,92,95,,95,9
2,95,,95,84,91,95,,95,84,95,,95,
92,92
140 DATA92,92,92,,92,80,92,,92,8
0,92,,92,80,84,92,,92,92,92,,92,
92,92
150 DATA47,44,47,,47,32,47,,36,4
7,40,,44,44,47
160 DATA47,33,47,,47,32,47,,32,4
7,32,,35,44,32
170 DATA44,44,46,,44,44,44,,36,4
4,40,,44,44,44
180 DIM D(55),P(55),N(55),Q(55),
A(8),CV(4),TV(10),N$(10),CS(15),
PS(15)
190 DATA BL2L3H2U7E2R3F2D7G2,BLL
6R3U11LGD,NU2L7U3E2R3E2U2H2L3G2D
2,BH4BL3D2F2R3E2U3H2NL2EU2HL3GD,
L3R2U11LG5D2R8,BL7BU2F2R3E2U3H2L
3G2U6R7D2,BU10BLHL3G2D7F2R3E2U3H
2L3G2,BL6E6U5L7D3,BU2G2L3H2U3E2H
U2ER3FD2GNL3F2D3,BL5NHR3E2U7H2L3
G2D3F2R3E2
200 FORI=0TO9:READN$(I):NEXT
210 JK(1)=100:JK(2)=10:JK(3)=1
220 PRINT@352,"        BY FRED B.
 SCERBO":PRINT"      COPYRIGHT (
C)  1985"
230 R=5:PRINT@416," ENTER NUMBER
 OF COINS  (MAX.15)":PRINT:PRINT@
```

```
460,"";:INPUT QW:IF QW>15THEN230
 ELSE IF QW=0 THEN 230
240 T=1:IF QW>5THENDL=2
250 IF QW>10 THEN DL=3
260 GOTO270
270 PMODE4,1:PCLS1:SCREEN1,1
280 CV(1)=1:CV(2)=5:CV(3)=10:CV(
4)=25
290 PMODE3,1
300 FORI=1TO3:DRAW"S16BM"+STR$(I
+84)+",136C7U3NR4U2END6R2ND6FD5B
R12C6U6RND6R2FDGNL2RFDGL3":NEXTI
310 DRAW"S12BM36,50C1U6R3FDGNL3B
D3BR3U6R3FDGL3R2F2DBR3NR3U3NR2U3
R3BR3BD6R3U3L3U3R3BR3BD6R3U3L3U3
R3BR2"
320 DRAW"BD6BR16U6L2R4BR3D6U3R4U
3D6BR3NR3U3NR2U3R3"
330 DRAW"BM27,88U6R3FDGL3R2F2DBR
3NR3U3NR2U3R3BR3ND6R2F2D2G2L2BR1
8NU6R3BR3NR3U3NR2U3R3BR3R2ND6R2B
R3R2ND6R2BR3NR3D3NR2D3R3BR3U6R3F
DGL3R2F2D"
340 X$=INKEY$:IFX$="A"THEN350ELS
EIFX$="B"THEN360ELSE340
350 L=7:GOTO370
360 L=6
370 CLS0:PMODE4,1:PCLS1:SCREEN0,
1
380 CIRCLE(40,40),14,0,.9
390 DRAW"S4C0BM48,44NG5U3EU4HULH
2L2HL5GLGDGD2FG2DRD2NR3D2FR2FRFD
RFRBU6GLREBU2REU2HL2BL3BDNL2NGHL
HLBU4R4BFGBGF"
400 CIRCLE(40,40),12,0,.9,.4,.2
410 GET(16,18)-(64,62),D,G:PCLS1
420 CIRCLE(80,40),16,0,.9:PAINT(
80,40),0,0:PMODE3,1:PAINT(80,40)
,L,8:PMODE4,1:SCREEN0,1:CIRCLE(8
0,40),16,0,.9:CIRCLE(81,40),16,0
,.9,.6,.3
430 LINE(60,26)-(100,54),PSET,B:
CIRCLE(80,40),14,0,.9,.15,.4:CIR
CLE(80,40),14,0,.9,.65,.9
440 FORI=70TO71:DRAW"C0BM"+STR$(
I)+",46UE3UBRNF2BLUE2UHU2HR2E2UR
BRR2FRFRDR2D2G4F2DRBL4F6BL4NH3BL
4NH4BU11U2R3BD2DBD5BR4NR4BL8BU4L
3NU2BL3BD2L5":NEXT
450 GET(56,18)-(104,62),P,G
460 FORI=0TO1:CIRCLE(135,40),20+
I,0,.8:NEXTI
470 COLOR1,0:LINE(110,24)-(160,5
6),PSET,B
480 FORI=17TO19STEP2:CIRCLE(135,
40),I,0,.8,.4,.7:CIRCLE(135,40),
I,0,.8,.9,.1:NEXT
490 DRAW"C0BM125,52U2ENR3U2E3R3E
R6FD2FD2FD2BR3U2HU2HU2NL4U3L3D3R
3U3E2UEUHU2HU2HLHL12GLGD2NR3GDNF
2FDG2DNR3R2DGDNR3GF2R2"
500 FORI=2TO6STEP4:CIRCLE(136,34
),I,0,1.3,.2,.5:NEXT
510 CIRCLE(138,50),6,0,.7,.5,.8
520 GET(111,18)-(159,62),N,G
530 FORI=20TO22:CIRCLE(200,40),I
,0,.9,.6,.9:CIRCLE(200,40),I,0,.
9,.2,.3:NEXTI
540 COLOR1,0:FORI=180TO210STEP5:
LINE(I,20)-(I+2,90),PSET,BF:NEXT
I
550 FORI=0TO1:CIRCLE(200,40),24+
I,0,.9:NEXT
560 CIRCLE(200,40),19,0,.9,.15,.
35
570 DRAW"C0BM212,52U2LU2H2U2H2R2
F3D2RD3BL4BU8R2E2U2HL2HL2H2L2GDB
R8U3HU2H2UHUL11GLGLDLD2LDLDBRF2B
DG3DR3LD2NR2D2F2R2FD3G3DGBR8BU9N
E4BL11BD2L4BH2R7BR7BU10H2NLBD2D"
580 GET(176,18)-(224,62),Q,G
590 GOTO640
600 PUT(C,D)-(C+48,D+44),P,PSET:
RETURN
610 PUT(C,D)-(C+48,D+44),N,PSET:
RETURN
620 PUT(C,D)-(C+48,D+44),D,PSET:
```

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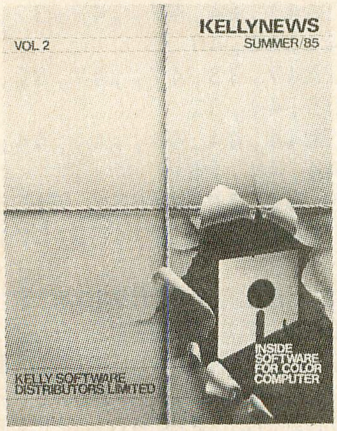
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```
RETURN
630 PUT(C,D)-(C+48,D+44),Q,PSET:
RETURN
640 PMODE4,1:PCLS5:SCREEN1,1
650 KC=0:PMODE3,1
660 HL=RND(30):IF HL<27 THEN 680
670 FOR RT=1TOQW:CS(RT)=HL-26:NE
XTRT:GOTO690
680 FOR RT=1TOQW:CS(RT)=RND(4)::
NEXTRT
690 SR=0
700 FOR RT=1TOQW-1:IF CS(RT)<CS(
RT+1)THEN720
710 NEXT RT:IF SR=1THEN690ELSE73
0
720 TEM=CS(RT):CS(RT)=CS(RT+1):C
S(RT+1)=TEM:SR=1:GOTO710
730 D=0:JC=0:FORY=1TO DL:C=2:FOR
I=T TO R:JC=JC+1
740 F=CS(JC)
750 TV=TV+CV(F):KC=KC+1
760 IF F=1THENGOSUB600ELSEIF F=2
THENGOSUB610ELSEIF F=3THENGOSUB6
20ELSEIF F=4THENGOSUB630
770 C=C+50:IF KC=QW THEN800
780 NEXTI
790 D=D+44:NEXTY
800 COLOR8,6:LINE(0,144)-(142,18
2),PRESET,BF
810 FORK=0TO80STEP40:LINE(32+K,1
48)-(56+K,178),PSET,BF:NEXTK
820 DRAW"C5S4BM62,178U3R2D3"
830 COLOR7,5:LINE(0,144)-(142,18
2),PRESET,B
840 DRAW"S8BM10,170C8FRND3NU12R2
ND3NU12REU3HL5U3ER4F"
850 PV=1:FORK=0TO80STEP40:DRAW"B
M"+STR$(K+44)+",140C7NU6NH2E2L3"
860 X$=INKEY$:IFX$=CHR$(8)THEN95
0ELSEIFX$="@"THEN970ELSEIFX$=""T
HEN860
870 KP=ASC(X$):IFKP<48THEN860ELS
EIFKP>57THEN860
880 KP=KP-48:DRAW"BM"+STR$(K+51)
+",174C7"+N$(KP)+"BM"+STR$(K+44)
+",140C8NU6NH2E2L3"
890 AV=AV+KP*(JK(PV)):PV=PV+1:NE
XTK
900 IF AV<>TV THEN940
910 NR=NR+1:DRAW"S16BM153,173C7H
U3ERFBD3GNLBR3HU3ERFD3GNLBR2U5R2
FDGNL2FDBRU5R2FDGNL2FDBRU5NR3D2N
R3D3R3BR2HU3ERFBD3GNLBR3U5L2R4":
SOUND200,4
920 FOR P=1TO1000:NEXT P
930 GOTO960
940 NW=NW+1:FOR BQ=1TO3:PMODE4,1
:SCREEN1,0:SOUND19,5:PMODE4,1:SC
REEN1,1:SOUND1,5:PMODE3,1:NEXT B
Q:AV=0:KP=0:GOTO800
950 DRAW"BM"+STR$(K+44)+",140C4N
U6NH2E2L3":AV=0:KP=0:GOTO800
960 AV=0:C=0:D=0:TV=0:GOTO640
970 PMODE4,1:PCLS1:CLS0:FORI=102
4TO1535:POKEI,32:NEXTI:SCREEN0,0
:PRINT@101,"number";:PRINT@165,"
number";:PRINT@108,"right";:PRIN
T@172,"wrong";
980 NW$=STR$(NW):NR$=STR$(NR):Q=
LEN(NR$):FORI=1TOQ:W=ASC(MID$(NR
$,I,1)):POKE1142+I-Q,W:NEXTI:Q=L
EN(NW$):FORI=1TOQ:W=ASC(MID$(NW$
,I,1)):POKE1206+I-Q,W:NEXTI
990 SCREEN0,0:J=NR+NW:IF J=0 THE
N J=1
1000 SC=INT(NR/J*100):PRINT@229,
"your";:PRINT@234,"score";
1010 NR$=STR$(SC)+"%":Q=LEN(NR$)
:FORI=1TOQ:W=ASC(MID$(NR$,I,1)):
POKE1271+I-Q,W:NEXTI
1020 PRINT@293,"another";:PRINT@
301,"try";:PRINT@306,"y";:PRINT@
308,"or";:PRINT@311,"n";
1030 X$=INKEY$:IF X$="Y" THEN RU
N ELSE IF X$="N" THEN CLS:END EL
SE 1030
```

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The Rainy Day Account

By Steve Bly
Rainbow Contributing Edito

You are never too young to learn the value of saving your money. One never knows when a rainy day emergency may come along. Similarly, one never knows when that big ticket item that you have been wanting for so long finally goes on sale.

Many school systems throughout the country have banking programs for elementary school age children. This helps to reinforce the importance of saving.

Parents and grandparents often open accounts for youngsters. This may represent a substantial amount of money. The child should not necessarily be aware of this account. We can, however, easily open a small account with the child for the purposes of instruction as well as savings. This account can help instill positive values and experiences into the child's environment.

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He and his wife, Cheryl, own Computer Island.)

A larger than life approach is often quite successful with younger children. This implies making a big deal out of what is often commonplace to us. Visiting a bank and signing your name to an application for an account is a big deal to many youngsters. (Signing for your first library card is in the category of important events.)

> ***"This month's program illustrates a simple bank account book that shows deposits and withdrawals."***

This month's program illustrates a simple bank account book that shows deposits and withdrawals. The child's task is to compute his balance after each transaction.

The child should first be familiariz by an adult with the meaning of t key words. They are withdrawa deposit and balance. These words m be likened to positive and negati numbers if this is appropriate for yo children. A deposit of $5.00 is simil to +5 and a withdrawal of $3.00 similar to –3.

The balance would be +2, which the sum of these two signed number An introduction to signed numbers ca be approached in this manner. Som children find this approach easy t understand; others would be bett served by using play money to figu out each transaction in a tangib manner.

The reasons we use a bank for ou savings should also be discusse Mention of the safety factor and th interest that may be earned can b explained by the adult. Children wi not initially believe that withdrawal can be made at any time. The fact tha the money is still his even though it i in the bank should be stressed.

200 249
END 63

The listing: BANKACCT

```
10 REM"BANK ACCOUNTS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,NY,1985
30 CLS:PRINT"WHAT IS YOUR NAME";
40 INPUT NA$
50 N$=LEFT$(NA$,10)
60 FOR N=1 TO 10
70 B=50
80 READ A$(N): NEXT N
90 CLS
100 PRINT@0,N$;"'S BANK ACCOUNT"
110 PRINT STRING$(32,255);
120 PRINT"DATE  WITHDRAWAL DEPOS
IT BALANCE" ;
130 PRINT"----- ---------- -----
-- -------";
140 PRINT"01/01    0          50
   50"
150 FORR=1TO10:PRINT@160+T,A$(R)
160 T=T+32
170 NEXT R
180 DATA 01/25,02/10,03/06,04/14
,05/22,07/15,09/30,10/19,11/08,1
2/17
190 FOR T=1 TO 10
200 D=RND(20)
210 R=RND(4)
220 W=0
230 IF R=4 THEN W=RND(20):D=0
240 PRINT@168+L,W;
250 PRINT@178+L,D;
260 PRINT@185+L,"";
270 INPUT G
280 B=B+D-W
290 IF G=B THEN PRINT@492,"CORRE
CT   ";:PRINT@185+L," ";:SOUND14
0,3:SOUND150,3:CT=CT+1
300 IF G<>B THEN PRINT@492,"SORR
Y";B;:PRINT@186+L,B:SOUND10,5
310 L=L+32
320 PRINT@26,"*=";CT;
330 NEXT T
340 SOUND200,5:PRINT@483,"PRESS
ENTER TO GO AGAIN.";
350 EN$=INKEY$
360 IF EN$=CHR$(13) THEN RUN ELS
E 350
```

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Integrating Computers Into Classroom Instruction

By Michael Plog, Ph.D.
Rainbow Contributing Editor

When educators speak of computer uses in schools, they generally think of computer assisted instruction (CAI) or computer management of instruction (CMI). When used as CMI, the computer may never be touched by students, but used as a recording device by teachers. Some teachers have even written programs to calculate grades and print report cards.

When used as CAI, students usually have direct access to the computer. If students are sitting at a computer keyboard, they are generally learning something through the electronic medium. The computer is transformed into a smart workbook. Student responses are used by the program to determine what problems to present next, or what to assign the student.

In math classes, for example, students are practicing addition facts in front of a screen instead of using paper and pencil. Sometimes the computer lesson presents new facts to students instead of drilling on facts already learned.

There is nothing wrong with this type of computer use in schools. Such learning can be very helpful for students by using the computer to drill or even introduce material, and no one would doubt the benefits of having the computer perform calculations for teachers.

In neither case, however, is the computer fully integrated into a lesson. Most CAI deals with lower order learning skills, such as practice, drill, etc. Some simulations attempt to deal with higher order thinking skills, such as synthesis, analysis of knowledge and testing hypotheses generated by students. This month, I would like to present a different type of classroom computer use, and ask your assistance about such suggestions.

For lack of a better term, we are calling this use of the computer "integrating with the lesson." This means the computer is used in a unit of study in various places to help students with higher order learning skills.

For example, let us consider a social studies lesson. (This example is presented only because I taught social studies, and am not all that familiar with other subject areas.) Intentionally, the lesson is one of the dullest I can think of: a civics or government lesson about local elections. The class is to be divided into several groups, each group attending to a single campaign.

The purpose of the lesson will be to have students learn about local election processes, understand factors that influence local campaigns, and conduct an analysis of election victories and losses. The class will not be spendin full time every day on the lesson, bu will be dealing with other activitie associated with local democratic processes. This class activity will take a fe months to be completed.

The role of the teacher in this lesso is to coordinate and guide studen activities. The teacher will do very littl lecturing, but spend most of the tim working with the groups of student The activities done by the students ar the key part of this lesson, includin their use of the computer.

Each group of students will have t write letters to tne candidates in th various races being examined. Th letters will explain what the class i doing, ask for interviews with th candidates, and ask for updates on new releases and public appearances. Th letters do not have to be the same fro each group, but all groups should b aware of other letters. A word processin package should be used to write th letters.

Throughout the campaign, eac group of students should identify a many issues as possible discussed b each candidate. The position of eac candidate on every issue should b recorded. A database package or wor processing package could be used t store issues and positions. This file wil need updating often, as candidate make speeches, public appearances an news releases come out.

(Michael Plog received his Ph.D. degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district, and currently is employed at the Illinois State Board of Education.)

The students should keep a record f each candidate's appearance before ivic groups, presentations before ublic bodies, news conferences, etc.

One important learning activity for he class would be to conduct a pre-lection public opinion poll of the races eing examined. There could be three r four such polls during the campaign. ach group would contribute questions o the poll, but there should be one poll rom the entire class.

The poll could be taken of students n the school and their parents (not just n the civics class). Results of polls hould be released to candidates and he newspapers — with an explanation hat the results are unscientific and robably not accurate in predicting the inal vote.

A spreadsheet or database package ould be used to store the poll results. BASIC program could be written possibly by students in the computer lass, not the students in the civics class) o calculate frequencies and percentages f responses to questions. If preferred, spreadsheet package could be used o calculate frequencies and percentages. ome of the graphics packages available n the market would be an excellent ay of obtaining figures and charts of he poll results. Naturally, a word rocessing package would be used to rite the results of the poll.

After the election, students could btain voting results by precinct for all aces studied in the class. Precinct esults can be stored on a spreadsheet r database. Comparisons of actual esults with the pre-election polls could e made to determine how close the ample matched the final vote. The recinct results have greater use for nalysis of the election, which is the urpose of the whole exercise.

Students can compare all races xamined by the groups of the class to ee what patterns exist. Each group ould have to share its files with all ther groups. In order to provide an nalysis of the elections, the teacher ay want to direct the classroom to ositions on issues held by candidates, eaking engagements, editorial support om news media and even precinct oting patterns. A BASIC program or ord processing package can be used merge important information from e various files created by the students.

Throughout this entire exercise, tudents are not taught anything about he computer itself; they never sit down in front of a keyboard for a lesson. The computer is integrated into the lesson, which would be impossible to complete in the same way without electronic assistance. Some students might learn how to type during the unit on local elections; some will learn their way around a database package; some will discover previously unknown secrets of a spreadsheet program; and some may never turn on the computer. Someone in each group will have to operate the computer: store and retrieve information, type reports and put pieces of data together in a coherent form. That does not mean all members of the group will have to be turned into computer operators.

The role of the computer is to organize information needed by the students in order to solve problems and assist with higher order thinking skills. In the truest sense of the term, the computer is a classroom tool, very similar to a 16mm movie projector or card catalog in the library. Students are never assigned a computer task for the purpose of that task itself, but only to help them in a learning experience.

After all, the purpose of this lesson is not to learn about commercial packages or BASIC programming; it is to learn about local elections. Without the electronic aid, students would have a much more difficult time sifting through the information on hand, and might not ever be able to conduct the same type of analysis that is possible with the computer.

The example of a civics class lesson is given for illustrative purposes only. The same type of activities could be done in many different classrooms with many different subjects.

As far as I know, there is no school where such a curriculum is in use. In all probability, there are individual classrooms where teachers are using the computer in the manner described above, but doing so in isolation from other teachers in the building. In a way, that is a desirable condition; teaching is an art, and individual teachers are expected to create individualistic lessons for their students.

If you, or anyone you know, is using the computer to conduct lessons similar to the one described, please write to me. I would like to know about the activities and start a file on such units of instruction. My address is 829 Evergreen, Chatham, IL 62629.

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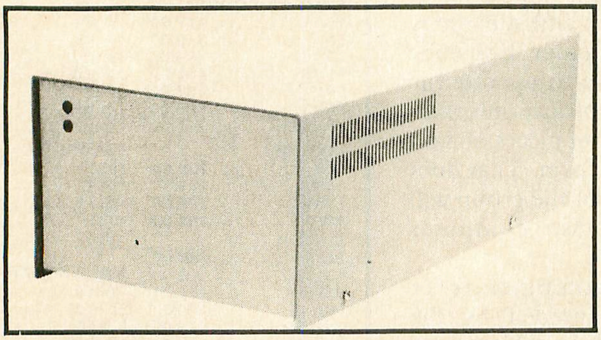

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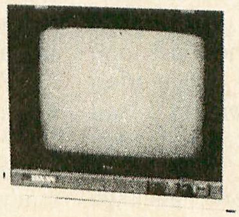

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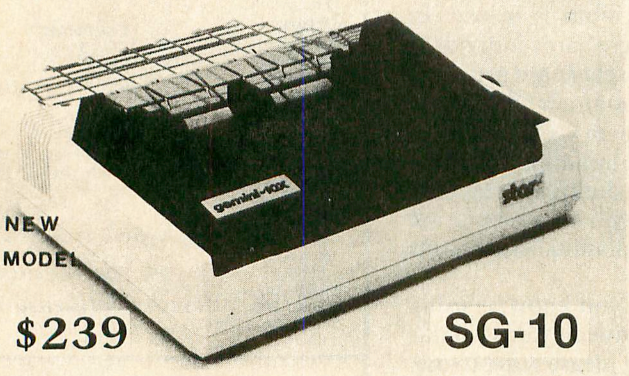

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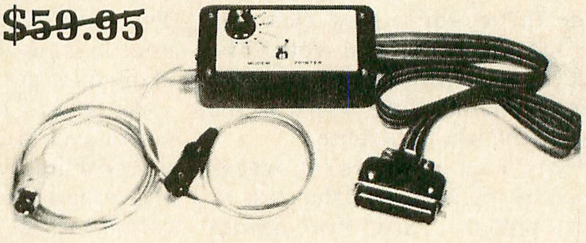

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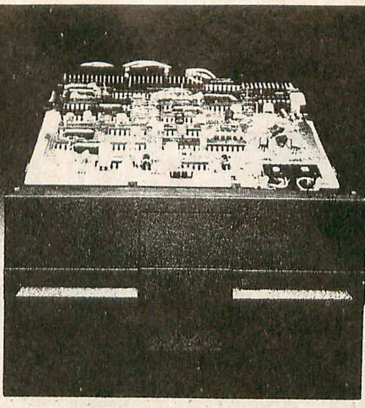

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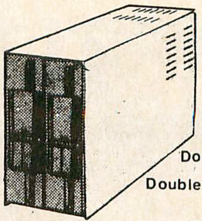

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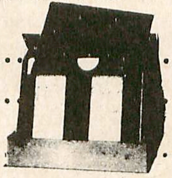

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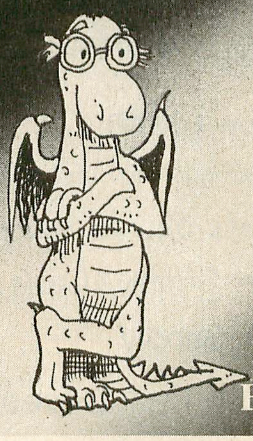

By George Firedrake and Karl Albrecht

It was September 1982. THE RAINBOW was small then — 106 pages. One of those pages was the first episode of "GameMaster's Apprentice." It began like this:

> Let's pretend. Let's go adventuring in a world of imagination where magic works and great deeds can be done. Let's explore, overcome adversity, solve problems and garner fame, glory and fortune. Let's play a fantasy role playing game.
>
> Role playing games are usually played by people sitting around a large table. As you walk into the game area, you see people obviously having a good time. Curious, you approach.
>
> The players interact animatedly. Then a player asks a question of the GameMaster. Play stops while she digs out the appropriate rule book. After some time, she answers. Play resumes, then stops again while rule books are consulted. You notice that much time is spent flipping pages in numerous rule books. Slowly, an idea forms in your mind. Why not use the Color Computer as a . . .
>
> * Database Management System
> * Management Information System
> * GameMaster Information System
>
> Call it what you will. We call it "GameMaster's Apprentice." In this series, we will surely, but slowly, explore how to use the Color Computer to help manage a fantasy world such as *Dungeons & Dragons, RuneQuest, Tunnels & Trolls* or *Worlds of Wonder*.

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Most people who play role playing games use a formal rule system. Some of the best known are shown below.

***Bushido**. Fantasy Games Unlimited, P.O. Box 182, Roslyn, NY 11576.*

***Champions**. Hero Games, 92A 21st Avenue, San Mateo, CA 94402.*

***Dungeons & Dragons (D&D)**. TSR, P.O. Box 756, Lake Geneva, WI 53147.*

***RuneQuest (RQ)**. Avalon Hill, 4517 Harford Road, Baltimore, MD 21214.*

***Star Trek**. FASA, P.O. Box 6930, Chicago, IL 60680.*

***Tunnels & Trolls (T&T)**. Blade, P.O. Box 1467, Scottsdale, AZ 85252.*

Beginners beware! The rule books are formidable. If you are a beginner, we suggest you start with one of the following books, both from Reston Publishing Company, 1480 Sunset Hills Road, Reston, VA 22090.

***Adventurer's Handbook: A Guide to Role Playing Games** by Bob Albrecht and Greg Stafford.*

*You will also need **Adventurer's Handbook** if you play our play-by-mail beginner's game. We call it DragonFun.*

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And so we did. This is the 27th, and last, "GameMaster Apprentice" in THE RAINBOW. Thanks, Lonnie, for givin us space and wonderful readers so we could experimer and develop this idea. We almost know how to do it now

Thanks, Bill Nolan, who wrote "The Dragon's Byte" fc quite a long time. We wrote tutorials for beginners or nea beginners. Bill wrote useful programs for experienced *D&* players.

Our three years writing for the best CoCo magazine ha been a great experience. This ending is another beginnin We'll tell you about that at the end of this final installmer of "GameMaster's Apprentice."

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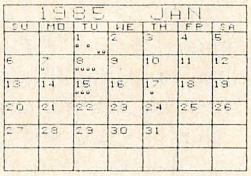

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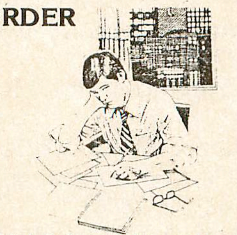

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Adventure Systems, 1669 S. Voss, Suite FF-H, Houston, TX 77057
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Rick Barr, P.O. Box 1873, Cave Creek, AZ 85331
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Comstar Enterprises, P.O. Box 601062, N. Miami Beach, FL 33160
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Graff Simulations, 27530 Harper, St. Clair Shores, MI 48081
Jabberwock Enterprises, P.O. Box 158, Somers, CT 06071
JF&L, 305 E. Caffery, Pharr, TX 78577
KSK Concepts, P.O. Box 375, Morris Plains, NY 07950
Neolithic Enterprises, 350 N. Lantana, Suite 58 Camarillo, CA 93010
Palace Simulations, P.O. Box 743, Madison, NJ 07940
Pierce & Co. PBM, P.O. Box 25675, Chicago, IL 60625
Quest Computer Services, P.O. Box 1300, Dahlgren, VA 22448
Rhiannon Enterprises, P.O. Box 510, N. Highlands, CA 95660
Schubel & Son, P.O. Box 214848, Sacramento, CA 9582
Superior Simulations, P.O. Box 505, Fairfield, ID 83327
Time Space Simulations, 5304 Crossfield Rd., Virginia Beach, VA 23464
Vigard Simulations, P.O. Box 231, Orangevale, CA 9566
White Lion Enterprises, P.O. Box 188, Wood Ridge, NJ 07075
Mike Williams, Route 4, Box 802, La Follette, TN 3776
World Campaigns, P.O. Box 321, Epping, NH 03042
Constantine Xanthos, 120 MacDougal St., NY, NY 1001
Zorph Enterprises, 3646 Gibsonia Rd., Gibsonia, PA 150

We know little or nothing about most of these companie However, without reservation, we can recommend Flyi Buffalo, Inc.

Fortunately, Rick Loomis, who can lay fair claim starting all this, has begun (or helped begin) an associati to promote responsible play-by-mail moderating. It is T PBM Association, 8149 E. Thomas Rd., Scottsdale, A 85251. Send them a self-addressed, stamped envelope a

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ey will send you a list of PBMA members.

If you play role playing games, play-by-mail games, on- ıe games on computer networks, or even solitaire dventure games on your CoCo, we bet you will enjoy e following books: *Dream Park* by Larry Niven, *Octagon* / Fred Saberhagen and *True Names* (novella) by Vernor inge in *BINARY STAR #5*, editor: James R. Frenkel.

loysious — One More Time

Aloysious made it across the creek, successfully climbed e embankment and exercised his displeasure by throwing few stones. Now, late in the day, he continues his journey.

Hit with fist — Success percentage: 50%

Aha! A "weapon," cheap and always available. For loysious, flailing with his fist is a hit or miss proposition. e connects about half the time, if he is trying to hit a rson of average SIZ and DEX.

Success: Roll 50 or less on the percentile dice
Failure: Roll 51 or more on the percentile dice

Night falls. Aloysious spends the night in the woods near cliff. He lights a fire and makes some tea. Presently, notices his shadow on the cliff and decides to get in little boxing practice. Roll the dice: 36. He lands a blow. uch! Well, so much for boxing your shadow on a cliff.

Hit with stick — Success percentage: 25%

This is the ability to hit a moving target with a stick similar weapon: a broom, shovel, rake or even a "real" eapon such as a mace or spear.

Success: Roll 25 or less on the percentile dice
Failure: Roll 26 or more on the percentile dice

Aloysious awakes with a start. In the bright moonlight ortunately), he sees a raccoon trying to pilfer his ovisions. He grabs his sturdy walking stick (always by s side) and leaps to the fray, flailing as he goes.

irst roll:	78	He misses.
cond roll:	89	Another miss.
hird roll:	52	Curses! Missed again.

The raccoon, too wise to remain hungry, runs away. loysious now does what he should have done before. He ngs his gear from a branch of a tree, out of reach of e more ubiquitous nocturnal bandits. With a sigh, he ttles down to a good night's rest.

And so we leave Aloysious, sleeping beneath the stars ith his seven characteristics and his 11 special skills. His lventures will continue to be chronicled in another place.

eport from Cairleon

We are playing *Feudal Lords* by mail, making one turn ıch month. We are the Lord of Cairleon on the west ›ast of Britain. There are five other human players, each e lord of a fief. Forty other fiefs are controlled by the mputer, which is also the GameMaster. This is a completely computer-moderated game.

The game we are in began in the game year 801. Here is the State of Cairleon as the game began.

Market Price for Food: Sell 10, Buy 11

Lord's Rank: Baron, Leadership 2

Gold	1400	Tax rate	20	Lumber mills	0
Food	1400	Markets	0	Fishing fleets	0
Knights	200	Cattle	0	Mines: Stone	0
Peasants	800	Ships	0	Metal	0
Townsmen	200	Agric. bonus	0	Gold	0
Castle	10	Champion	3	Gem	0

Each turn is one game year. We can send up to 12 orders selected from a list of 31 possible orders. We spent about three hours trying out various possibilities. Soon we will have a CoCo program to help us!

First, we must feed our peasants and knights at least one food unit per year, a total of 800 + 200 = 1,000 food units. Townsmen will buy their own food. We have an excess of 400 food units. We decided to give our peasants an extra 100 food units to encourage population growth. Peasants are the strength of a fief — they grow most of the food.

We now have a surplus of 300 food units. We will sell 250 at the market price, thus increasing our gold supply from 1,400 to 3,900. We will soon spend much of this gold.

The rulebook informs us that about 25 percent of surplus food will spoil, so we convert the surplus to livestock at a cost of five gold and one food unit for each unit of livestock. We buy 50 livestock. This brings our gold supply down to 3,650.

In the year 801 "food is gold," so we will use some gold to increase our ability to grow food. We spend 1,000 gold on agricultural research. We now have 2,650 gold.

We send two spies to tell us what is going on in the neighboring fiefs of Hereford and Glamorgan, both controlled by the computer. Spies cost 100 gold each, which leaves us 2,450 in our treasury.

It costs five gold to maintain a knight — there goes a cool 1,000 gold to maintain our 200 knights! We decide to disband half our army in order to use more gold to build other resources. In a couple of turns we will build the army up again. We now have 1,450 gold.

Let's spend a little more gold. We'll build a fishing village at a cost of 300 gold. This will produce additional food in the future. Here is a summary of our orders.

Order Code	Additional Info	Description
16	250	Sell 250 food
21	1000	Spend 1,000 gold on agricultural research
18	100	Give 100 extra food to peasants
23	24	Send spy to fief #24 (Hereford)
23	21	Send spy to fief #21 (Glamorgan)
8	100	Disband 100 knights
20	50	Buy 50 livestock
29		Build one fishing village

We mailed our orders to Flying Buffalo and waited for a reply. In the meantime, we send letters to the Lord of Denbigh and the Lord of Dorchester, suggesting a friendly and mutually supportive alliance. Without allies, you will soon be wiped out in this game!

Soon the computer replied with a very complete repo of the State of Cairleon and news of other events in Britai

	Gold	Food	Peasant	Townsmen	Knights
Cairleon began 801 with:	1400	1400	800	200	200
Maintain 200 Knights	-1000	-200	+0	+0	+0
Disband 100 Knights	+0	+0	+0	+90	-100
Sell 250 food at market	+2500	-250	+0	+0	+0
Townsmen had to buy 200 food					
Give 900 food to peasants	+0	-900	+0	+0	+0
Agricultural research faileth	-1000	+0	+0	+0	+0
Spy on Hereford	-100	+0	+0	+0	+0
Spy on Glamorgan	-100	+0	+0	+0	+0
Buy 50 livestock	-250	-50	+0	+0	+0
Build 1 Fishing Fleet	-300	+0	-10	+0	+0

Thy Chancellor reporteth the following revenues:

Tax & population growth/decline	+1914	+0	+59	+15	+0
A normal harvest (1.52) (Average harvest was 1.6)	+0	+1290	+0	+0	+0
Fishing	+0	+18	+0	+0	+0
Livestock increase by 10					

Thy Sheriff reporteth other events in thy fief:

28 foreign knights join thy service.

Thy Marshall reporteth the following military activity:

* In Cheshire: Wroxeter won a 8:1 raid against Cheshire.
* In Devon: Cornwall won a 8:1 raid against Devon.
* In Gloucester: Hereford won a 1:1 raid against Gloucester.
* In Uxworth: Norfolk lost a .4:1 siege against Uxworth.

Thy champion rode errant into the Fens and defeated dwarves, gaineth eight peasants.

Spy reports

Hereford	Player: non-player				No Overlord	
	Gold	1874	Peasants	819	Castle	10
	Food	1439	Townsmen	204	Ships	0
	Knights	183				
Glamorgan	Player: non-player				No Overlord	
	Gold	2161	Peasants	854	Castle	11
	Food	1332	Townsmen	191	Ships	0
	Knights	211				

Well, that was a good year. Cairleon begins the year 02 as follows.

Market Price for Food: Sell 9, Buy 10

Lord's Rank: Baron, Leadership 2

Gold	3064	Tax rate	20	Lumber mills	
Food	1308	Markets	0	Fishing Fleets	1
Knights	128	Livestock	60	Mines: Stone	0
Peasants	857	Ships	0	Metal	0
Townsmen	305	Agric. Bonus	0	Gold	0
Castle	10	Champion	4	Gem	0

Except for the size of its army, Cairleon is in much better hape than at the beginning of the game. Now if we would ust get a favorable reply from the Lords of Denbigh and Dorchester.

Feudal Lords is an excellent multi-player Simulation ame requiring much careful analysis, record keeping, iplomacy, contingency planning, resource management, tc. For more information, write to either of the following.

- Flying Buffalo, Inc., P.O. Box 1467, Scottsdale, AZ 85252-1427
- Graaf Simulations, 27530 Harper, St. Clair Shores, MI 48081

ames for Beginners?

If you are a beginner, you may be at a disadvantage n a multi-player, play-by-mail game. Why? Because there ill probably be experienced players in the game who know rategies you don't know. We are trying to arrange some ames for beginners only. In these games, *all* players will e beginners (unless someone lies — please don't).

If you are interested in playing in a beginner's game, send a self-addressed, stamped envelope to *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026. Be sure to tell us what you want — we get lots of self-addressed, stamped envelopes!

DragonSmoke

We will continue with our own newsletter, which began in the same way as THE RAINBOW. Our first issue (January 1985) consisted of two pages run off on our Canon PC copy machine. *DragonSmoke* grows as did RAINBOW. Our February issue had eight pages; March, 16 pages, April, 20 pages; and May, 24 pages.

THE RAINBOW grew and became the number one magazine for the CoCo Community, with more than 200 advertisers and almost everything a CoCo user could possibly want. THE RAINBOW covers the world for CoCo users, from beginner to expert.

DragonSmoke will remain small. It will not take ads. It does not compete with magazines like THE RAINBOW. It is for beginners. It explores computers for beginners, role playing games, play-by-mail games, encourages new ways to learn and points CoCo users back to RAINBOW.

In *DragonSmoke*, we will rerun "GameMaster's Apprentice" from the beginning. Thanks to our RAINBOW experience, we can make it better the second time around.

Here are some ways to sample *DragonSmoke*:

- Send $1 and we will send you the first three issues: January, February and March.
- Or, send $1 and tell us you want the most recent issue.

Our address is *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026.

Farewell, RAINBOW. For us, this is the end . . . of a beginning.

One-Liner Contest Winner . . .

As many people already know, Halley's Comet is already well within our solar system and is expected to make its appearance later this year. This program is a graphics presentation of the sun, Earth's orbit and the path of the comet.

The listing:

```
1 PMODE3:PCLS3:SCREEN1,0:FORX=1T
O80:PSET(RND(250),RND(190),2):NE
XT:CIRCLE(70,95),12,2,.9:PAINT(7
0,95),2,2:CIRCLE(70,95),55,,.9:F
ORY=1.4TO4.9STEP.03:V=COS(Y)*177
+230:H=SIN(Y)*65+95:PSET(V,H,1):
NEXT:PLAY"O1T3V13L1CV24GO2V28CP5
O3L4EL1D+":GOTO1
```

Don Rowan
Minneapolis, MN

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Adventures* and its companion *Rainbow Adventure Tape.*)

One-Liner Contest Winner . . .

This program sorts strings alphabetically. Simply input the number (up to 999) of strings to be sorted and then input each string.

The listing:

```
1 DIMN$(999):CLS:PRINT@43,"SUPER
 SORT":INPUT"# OF WORDS";W:FORX=
1TOW:INPUT"INPUT WORD";N$(X):NEX
TX:FORS=1TOW-1:IFN$(S)<=N$(S+1)T
HENNEXTS:CLS:FORX=1TOW:PRINTN$(X
):NEXTX:END:ELSEH$=N$(S):N$(S)=N
$(S+1):N$(S+1)=H$:S=0:NEXTS:CLS:
FORX=1TOW:PRINTN$(X):NEXTX
```

Michael Stankas
Moundsville, WV

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

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  - sort on 3 fields simultaneously
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  - search for records within range
- Phrase substitution editor - fast ML delete routines
- Up to 8 user-definable fields per record
  - up to 230 characters per field
  - variable field length
  - variable record length

  (memory allocated is the actual length of the record)
- Upper and lower case
- User-selected report formats
  - report headings
  - full margin control
  - select which records to print
  - select field to print
  - select order in which fields are printed
  - multiple fields per line
- Send TIMS file to either tape, disk or printer — allows you to use the extensive editing capability available with a word processor to add to or combine other data with a TIMS report
- Save, load, append and verify routines

TIMS

database management system

```
SUGAR SOFTWARE PRODUCTS SORTED BY AUTHOR                         TIMS
NOVEMBER 1, 1983                                                 PAGE 1
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DENNIS ZAEBST
STATGRAF                    EDUCATIONAL                GRADE 10 AND UP
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G.T. BARRICK
THE GREAT USA               EDUCATIONAL                GRADE 4 AND UP
16K            TAPE                   $19.95

GARY DAVIS
AUTO RUN                    UTILITY                    PROGRAMMER
16K            TAPE                   $19.95
```

or this? . . . .

```
SUGAR SOFTWARE PRODUCTS SORTED BY TITLE                          TIMS
NOVEMBER 1, 1983                                                 PAGE 1
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PIRATECTOR                  GARY DAVIS                 UTILITY
DISK     32K      $99.95            PROGRAMMER

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```

or this? . . . .

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G.T. BARRICK     THE GREAT USA     16K     TAPE     $19.95

EDUCATIONAL      GRADE 5 AND UP
GARY DAVIS       SILLY SYNTAX      16K     TAPE     $19.95
```

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32K ECB recommended

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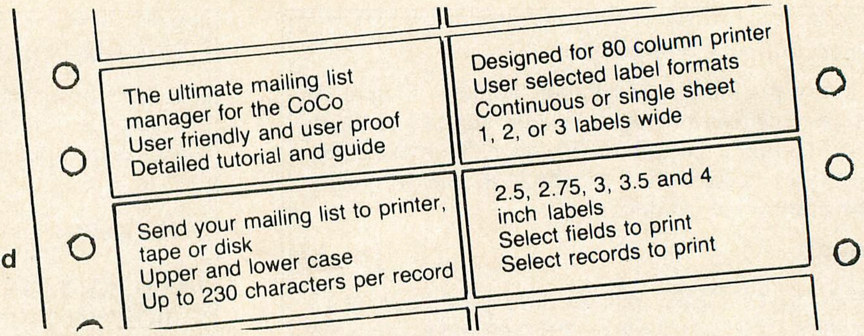

The ultimate mailing list manager for the CoCo
User friendly and user proof
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Send your mailing list to printer, tape or disk
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Select fields to print
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TIMS UTILITY

$14.95 - Tape

TIMS UTILITY features:

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Global Change - This is the "automatic" version of the modify mode. It can be used when there is a unique set of features in a specified field. For example, we could change all references to Rainbow to RB.

Global Delete - Automatically deletes every record in the database which meets the search criteria.

Record Change - Add or delete fields to your records. The maximum number of fields per record is still 8.

Split File Mode - Use "AND" logic (all articles published in Rainbow and written by Davis) "OR" logic (all customers in Ohio or Maryland), or Range Search to split your large file into 2 or more smaller files. You can save your new file to tape or disk.

TIMS UTILITY comes on tape and is disk compatible. It requires 32K, and a file created with either TIMS or TIMSMAIL.

ugar
Software

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Use your CoCo, your 8-bit dot addressable graphics printer and the **CoCo Calligrapher** to create beautiful signs, invitations, flyers, greeting cards, diplomas, certificates, awards and love letters.

The original **Calligrapher** letters are 36 points (1/2 inch) high and variably spaced. It includes an easy-to-use, menu-oriented program and these three typestyles:

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Old English Cartoon

Gay Nineties

Gay Nineties

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Old English **Gay Nineties** **Cartoon**

uvwxynoldsbabcde

All typestyles on Tapes 2, 3, 4, 5, and 6 include Standard (1/2 inch), Reversed, Reduced, and Reduced-Reversed unless otherwise noted.

Tape 2: Broadway/Old Style

Broadway Oldstyle

Tape 3: Business/Antique

Business Antique

*These disks of additional typestyles are available for **$49.95** each.*

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Switching Double-Sided Disks

By Tony DiStefan
Rainbow Contributing Edito

It was great seeing the whole RAINBOW gang at the Chicago RAINBOWfest in May. That made my first RAINBOWfest anniversary. There were a lot of new products to be seen. Fancy software, new and improved hardware, and a lot of new faces.

These get-togethers are quite warm and friendly. I have gone to many computer shows, some for different kinds of computers and some that host just one brand. But, I have never seen one that came close to the atmosphere at a RAINBOWfest. I tip my hat to the CoCo Community.

Speaking of new products, look forward to seeing my new line of products, starting with the DISTO disk controller.

Clearing up Confusion

The topic of this month's project involves disk drives and disk controllers. There seems to be some confusion about disk drives being double-sided, double-density, single-sided, single-density, 96 or 48 tpi (tracks per inch) and the compatibility between them. Especially when you talk about OS-9.

> ***"When the Color Computer first came out, the only mass storage available was a cassette recorder. Though the cassette recorder works well for music and speech, it was slow and not well-suited for computer work. A new form of mass storage had to be invented: The diskette was introduced."***

I hope to clear all that up right here and now and follow it up with a small project to let you see just what side of the fence, uh . . . I mean disk, you are on.

I will start off by describing a diskette and a disk drive. First, a diskette i form of media. It holds information what information is up to you. telephone numbers file, a game or tw your favorite word processor. All these are files that make your comput function the way it does; this data h to be stored somewhere.

When the Color Computer first ca out, the only mass storage available w a cassette recorder. Though the casse recorder works well for music a speech, it was slow and not well-suit for computer work. A new form of ma storage had to be invented: The diske was introduced. There are many kin of diskettes on the market today, b I will limit this discussion to those th are compatibile with our lovable CoC

Without going into too much deta the Radio Shack standard diskette us with the CoCo is a 5½-inch, sing sided, double-density, 35 tracks at tpi, soft-sectored diskette. The Rac Shack Disk BASIC, disk operati system, drive and controller are ma to comply with these standards. Y can get more details on the DOS in t Disk BASIC manual. The Radio Sha controller is made to handle two or fo drives, depending on what cable y have.

(Tony DiStefano is well-known as an early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.)

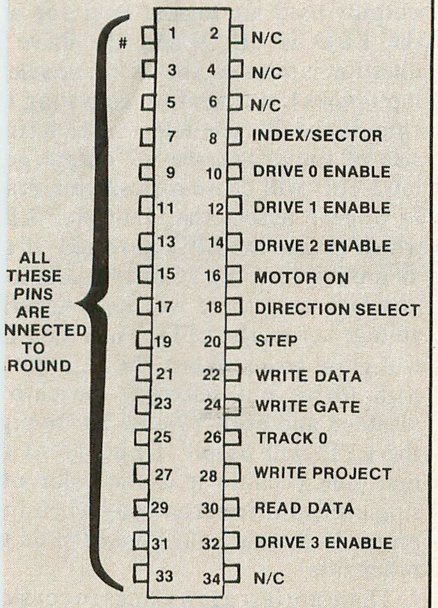

Figure 1
34-pin disk drive connector pinout

Note: Looking at the DISK CONTROLLER edge connector, pin #1 is the top right-hand pin

The disk drive itself connects to the ntroller via a 34-pin ribbon connector. gure 1 shows the pin configuration the "disk side" of the controller. As u can see from the diagram, four pins used for selecting or activating up our drives. Radio Shack drives differ m standard drives by the way they selected. You see, all four pins on dio Shack drives are connected gether and the selecting is done by ssing pins in the cable connector.

For example, to select Drive 2, the ble connector that is configured to number 2 has the pins that correspond drive numbers 0, 1 and 3 missing. at way, when another drive is ected, it won't affect that drive cause that pin is missing.

There is one more interesting thing out the Radio Shack cable configation. Drive 3 pin on the controller not in the normal position for a ndard drive. The normal position for standard Drive 3 is pin #6, where dio Shack chose to keep this pin pty.

Interestingly enough, though, the ace they did put it is where the ndard disk drive has its side select, pin #32 (for double-sided drives only). Since this pin is connected to the controller, it gives us access to the second side of a disk drive. All the hardware is there to use the second side, providing you have double-sided drives.

Today, the price of double-sided drives is so low that in some cases it is cheaper to buy a double-sided drive from another company than it is to buy a single-sided drive from Radio Shack. More and more people already have them and are not using the second side because Disk BASIC does not allow them to do so. I will show you a couple of ways to access the second side. One is software and the other is hardware. Use the method that suits you best. Either way, you will want to build the project if you have double-sided drives.

> ***"There are two ways to change the mask byte in software. One is to burn the new mask byte into an EPROM. The second is to use the 64K mode of the computer and make the changes in RAM."***

The first thing to do to use the double-sided drive is make sure you have one! You must connect it to the Radio Shack controller. Remember, I said there were pins missing in the Radio Shack cable and that will give us problems.

The side select pin is only present on a four-drive cable, and then only on the fourth drive. You must add another connector for every double-sided drive you are adding to your system. (They are available at your nearest Radio Shack Computer Center.) The connector is a 34-pin edge card connector. If you don't know how to install it on your cable, ask your dealer to do it for you. Have him press the new connector about an inch and a half away from the old connector.

The disk drive now has to be configured to which drive number you want. There are jumpers inside the drive you must set. In the owner's manual of the drive there will be instructions on how to do that.

Now you have a double-sided drive on line, but you will still need a way to access it. The first way is in software. The way Disk BASIC selects the drive is by using four "mask" bytes. Each byte contains the necessary data in order to activate that drive number. There are four bits that control each of the output pins as seen in Figure 1.

In the controller, there is a memory-mapped byte that controls the output of these pins. It is at $FF40 or 65344. Try this:

```
POKE 65344,1
```

The select light on Drive 0 turned on.

Now try the values two, four and 64 instead of one. This will turn on drive numbers 1, 2 and 3, respectively. The last value of 64 activates Drive 3 (if you have four drives), but remember on our double-sided drive that is the side select. By changing the values on the four mask bytes we can access the second side of the drive. By changing the mask data, you can access the second side of the drive as another drive.

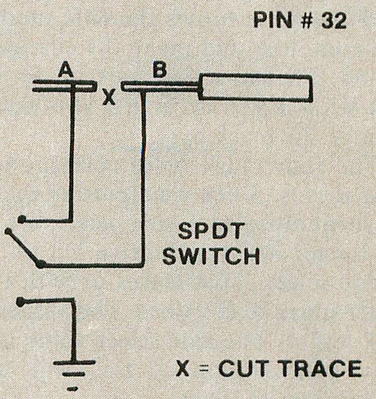

Figure 2
Double-sided drive switcher

Example: If you have one single-sided Radio Shack drive and one double-sided drive with the right changes to the mask byte, you will have three drives on line. The Radio Shack drive is the first, the first side of the double-sided drive is the second and the second side of the double-sided drive is third. If you had two double-sided drives, it would be as if you had four separate drives. Two double-sided drives is the maximum you can have with Disk BASIC because there are only four mask bytes.

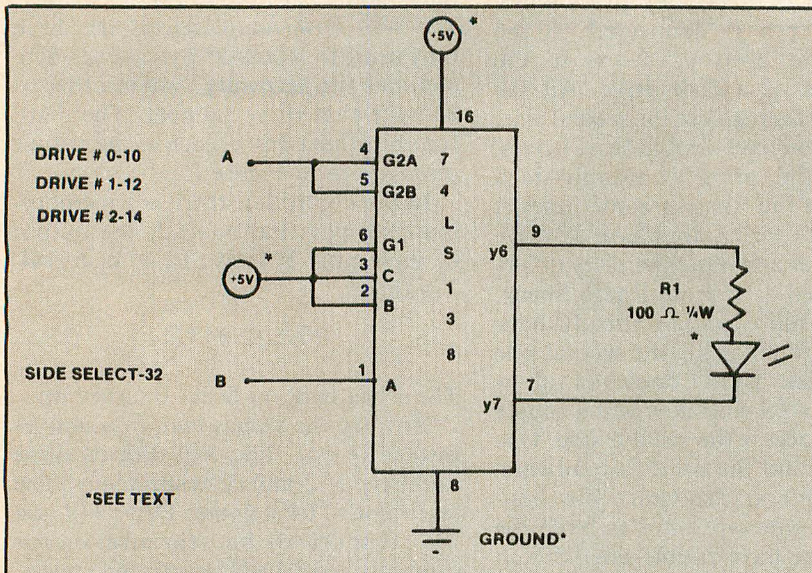

Figure 3
Dual color-drive side indicator

There are two ways to change the mask byte in software. One is to burn the new mask byte into an EPROM. The second is to use the 64K mode of the computer and make the changes in RAM. I'll leave that part up to you, but what I will do is tell you how to change the mask byte.

The four mask bytes correspond to four drives. Since we are using the last drive number as a side select, we can no longer use it as a drive but only as a side select. That leaves us with three other mask byte values. The values are 1, 2 and 4. The side select value is 64. Any combination of this will work (maximum of four).

First example: Your first drive is a Radio Shack single-sided drive. You want it to be Drive 0, so the value of the first mask byte is '1.' Your second drive is a double-sided drive; they will be Drive 1 and Drive 2. The second mask byte will be '2' and the third byte will be 65. The fourth byte will be untouched.

Second example: You have two double-sided drives. Drive 0 will be the normal side of the first drive; Drive 1 will be the normal side of the second drive. Drive 2 will be the second side of the first drive and Drive 3 will be the second side of the second drive. The four mask bytes are 1, 2, 65, 66.

Radio Shack has two versions of DOS: 1.0 and 1.1. The memory address of the four mask bytes for DOS 1.0 is $D7AA (55210); the address mask bytes for DOS 1.1 is $D89D (55453), plus the next three bytes for the other three values.

If all that doesn't thrill you, you can select the other side by adding a small switch to your disk controller. Figure 2 shows how to hook up the switch to your controller. You must cut the foil between points 'A' and 'B.' Drill a suitable hole in the cover of the controller to mount the switch. When the switch is in the up position, the normal sides of all double-sided drives are accessed. When the switch is in the down position, the second side is accessed. Never change the switch when doing I/O to disk since it will ruin both sides. Again, remember, you must not use the fourth drive on a four-drive connector.

To some, it is easier to install the switch than to do it in software, but it is a little more difficult to manually flip the switch. In any case, visual cue as to what side of the disk you are really on is almost a necessary option.

Figure 3 is a schematic for a circuit that will tell you what side of the drive you are using by lighting a different color LED for each side. This circuit goes inside the disk drive and replaces the "active drive" select LED. The heart of the circuit is the Radio Shack Tri-Color LED (part #276-035). This LED glows one of three colors. We will be using only two of these colors, red and green. The circuit uses a 74LS138 decoder.

When no drive is selected, the t outputs used are logical level one a the LED is off. When the drive question is selected, the 'A' (drive sele input goes low, therefore activating t chip. If the 'B' (side select) is high (fi side of the drive), the Y7 output go low. This will cause a positive volta to appear across the Tri-Color LE which makes the LED glow red. If t 'B' input is low, the Y6 output goes lo in which case there will be a negati voltage across the LED. Then the LE will glow green. When the 'A' input high (drive not selected) the chip disabled and both Y7 and Y6 are hig the LED will be off. I put red as t first side because it is the color of single-sided drive. That way when I s green, I automatically know I'm on t other side.

There are just a few things to consic when hooking up this circuit inside t drive. The first is where to get the fi volts and ground needed to run t circuit. The easiest place to get a grou is pin #1 of the drive cable connect Pin #1 is on the side of the connect that has all the pins connected togeth They are all the odd-numbered pi The drive connector pins are number on each end.

Five volts can be taken from the l pin of any 74LSXX chip. Use a v meter to check the voltage. This is eit pin #14 or #16 depending on how ma pins there are on that chip.

The second thing to watch for is make sure the 'A' input matches th of the drive selected. This means if t 'A' wire goes on Drive 0, make su the drive configuration block is set Drive 0, otherwise the LED will nev light.

The actual construction of the circ can be done on a small perf board. Ta or glue down the board in an unus area of the disk drive. Make sure doesn't get in the way of the diske that enters the drive. Remove the c LED. Replace it with the new one. U tape or glue to hold it down.

Now, try the drive and access the fi side of the drive. The LED should red. If it is green, reverse the wires th go to the LED. When all is OK, t LED will glow red for the first side a green for the second side. This way y will always know which side of the dri the software is accessing.

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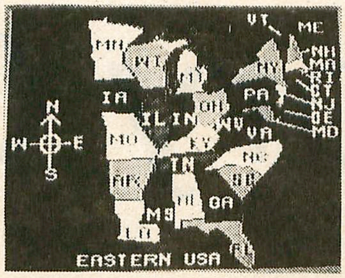
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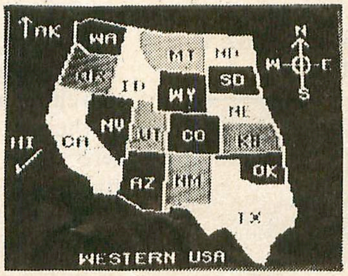
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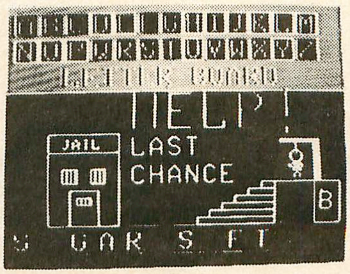
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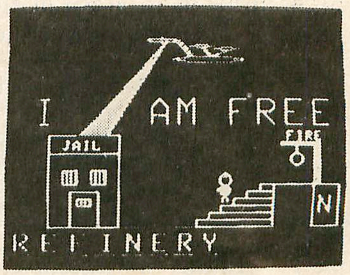
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Memory On A STRING$ Bu

One of the most powerful string functions available in Extended BASIC is the INSTR (in-string) function. This function searches for the first occurrence of String 1 in String 2 and returns the position at which the match is found. If no match is found, it returns a zero.

This may be difficult to grasp at first, so let's look at some examples in order to illustrate the function:

```
1. A=INSTR ("ABCDEFG","C")
2. A=INSTR ("ABCDEFG","CDE")
3. A=INSTR ("ABCDEFG","X")
4. A=INSTR (2,"ABCDEFG","CDE")
5. A=INSTR (5,"ABCDEFG","CDE")
```

Example 1 — In this first example, the value of 'A' will be set to three since the character 'C' is located in the third position of the string "ABCDEFG"

Example 2 — In this case, the value of 'A' will also be set to three since the string "CDE" starts at the third position of the string "ABCDEFG"

Example 3 — Here is a case where 'X' is not contained in the string "ABCDEFG," so the value of 'A' is set to zero, meaning no match was found.

Example 4 — You can add a numeric value (must be less than the length of the string being tested) at which point you want to start the search. In this case, the compu will start searching at Location 2 (the 'B') of str "ABCDEFG" to see if the string "CDE" is contained wit it. The value of 'A' will be set to three in this exam since a match will be made and "CDE" starts at Posit 3 of the string being tested.

Example 5 — In this example, the computer will st searching at Location 5 (the 'E') to see if "CDE" is contair in the rest of the string. The value of 'A' will be set zero since "CDE" is not contained in that section of string being tested.

You can use string values in the program step rat than the actual strings. Here is an illustration:

```
10 X$ = "ABCDEFG"
20 Y$ = "CDE"
30 Z$ = "X"
40 A = INSTR (X$,Y$)
50 B = INSTR (X$,Z$)
60 PRINT A
70 PRINT B
```

If you run this program, the screen will show a th (the value of 'A') since Y$ was found in X$ starting Location 3, and a zero (the value of 'B') since Z$ is contained within X$.

This is powerful stuff! But, how do you use it i program? Here are some examples. Let's assume you h

(Jorge Mir is a certified public accountant and controller of a Fortune 500 Corporation. He publishes most of his original work through THE RAINBOW)

dget

By Jorge Mir

data file containing names and addresses which have en stored in string values from N$(1) to N$(100) and u want to find out if there is anyone in the file who es in Atlanta, Georgia. The subroutine might look like s:

```
1000 INPUT "KEYWORD: ";K$
1010 FOR X = 1 TO 100
1020 IF INSTR (N$(X),K$) = 0 THEN 1040
1030 PRINT N$(X)
1040 NEXT X
```

When the computer reaches this subroutine, you will prompted for a "keyword" (Step 1000). In this case u will enter the word `ATLANTA`. The subroutine then goes o a loop, testing each of the 100 items in memory. Step 20 tests to see if the word "Atlanta" (stored in K$) is ntained in the string N$(X). If it is not, it will return zero and the program jumps to Step 1040 where it ntinues to the next name and address. If it is contained the string N$(X), it will then continue with Step 1030 d print that name and address record on the screen.

Please note that in the case above all records containing e word "Atlanta" will be printed on the screen, so if ere is an Atlanta, Florida in the file, it will also be printed. kewise, if someone's name is Atlanta, or if there is a eet named Atlanta, those will also be printed. If you nt to avoid this, you can type the keywords `ATLANTA, ORGIA`, thus restricting the search further.

The `INSTR` function can also be used to conserve space in a program. For example, let's assume your program contains a menu from which the user is to select an item. The subroutine might look like this:

```
2000 CLS
2010 PRINT " A - ITEM ONE"
2020 PRINT " B - ITEM TWO"
2030 PRINT " C - ITEM THREE"
2040 PRINT:PRINT"     YOUR CHOICE?"
2050 I$ = INKEY$ : IF I$ ="" THEN 2050
2060 ON INSTR("ABC",I$) GOTO 2100,2200,2300
2070 GOTO 2050
2100 PRINT " YOU CHOSE ITEM ONE":END
2200 PRINT " YOU CHOSE ITEM TWO":END
2300 PRINT " YOU CHOSE ITEM THREE":END
```

Steps 2000-2040 print the menu on the screen. Step 2050 assigns a value to I$ equal to the key pressed on the keyboard (if no key is pressed, it repeats the step until a key is pressed). Step 2060 determines if the key pressed is an 'A,' 'B' or 'C.' If it is one of these keys, the program will continue with step 2100, 2200 or 2300. If it is not any of these three keys, Step 2070 will return to the start of the loop at Step 2050.

The function can also be used to conserve memory space by compacting data into strings and later being able to separate the data. Let's assume you want to add certain information to the name and address file referred to in a previous example. In addition to variables N$(1-100), you can also create variables I$(1-100) to store the added data, but this will use up a lot of memory. Instead, you can add the data to variables N$(1-100) using a specific code in order to indicate where the name and address data ends and the added data begins.

Let me illustrate how this could be done. Suppose you want to code each name and address file to indicate whether it belongs to a friend (code 1), a relative (code 2) or a business associate (code 3). In addition, you want to indicate whether a Christmas card was received (code 4), or sent (code 5).

Here is the way the data could be compacted:

```
3000 FOR X = 1 TO 100 : PRINT N$(X)
3010 INPUT "TYPE (1-3): ";T$
3020 INPUT "XMAS CARD RECEIVED (Y/N)";I$
3030 IF I$="Y" THEN CR$ = "4" ELSE CR$ = ""
3040 INPUT "XMAS CARD SENT (Y/N)";I$
3050 IF I$="Y" THEN CS$ = "5" ELSE CS$ = ""
3060 N$(X) = N$(X) + "/" +T$ + CR$ + CS$
3070 NEXT X
```

Step 3060 compacts the data by adding the '/' to indicate where the name and address ends and the codes start. If you had indicated that the record was a business associate from whom a Christmas card was received, it would look like this:

```
NAME AND ADDRESS/34
```

To select specific names and addresses through a subroutine, you have created the variable C1$ containing a '3' and the variable C2$ containing a '4' because you want to search the name and address file to find all business

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associates who have sent you Christmas cards, then pr
such names and addresses. Here is what the subrout
would look like in order to accomplish this:

```
4000 FOR X = 1 TO 100
4010 A = INSTR (N$(X),"/")
4020 IF A = 0 THEN 4060
4030 IF INSTR (A,N$(X),C1$) = 0 THEN 406
4040 IF INSTR (A,N$(X),C2$) = 0 THEN 406
4050 PRINT LEFT$(N$(X),A-1)
4060 NEXT X
```

In steps 4010-4020, we find out if the record has b
coded. If the character "/" is not contained in the stri
it means it has not been coded and the program goe
the next record.

In steps 4030-4040, we find out if both codes
contained in the record by examining the charac
contained in variable N$(X) starting at the spot in the rec
where "/" was found. If neither of these codes is fou
the program advances to the next record.

In step 4050 we print the record, except we exclude
character "/" and the codes that follow, only printing
name and address. In other words, we print the left
of the record up to the character prior to where
is located.

Now, let's complicate this matter further. Let's assu
the name and address record which is all contained i
single string contains a '$' to indicate separations betw
name, city, state and ZIP code (since you want the
printed in the usual format rather than in a single li
In this case, N$(X) would look like this:

```
JOE SMITH$1234 MAIN STREET$ANYTOWN, WI 53533/34
```

In order to print the record in the regular name
address format, steps 4045 and 4055 would be adde
the subroutine and would look like this:

```
4045 N=INSTR(N$(X),"$"): IF
     N=0 THEN 4050 ELSE
     MID$(N$(X),N,1) =
     CHR$(13):GOTO 4045
4055 N=INSTR(N$(X),CHR$(13)):
     IF N=0 THEN 4060 ELSE
     MID$(N$(X),N,1)="$":GOTO
     4055
```

In Step 4045, we replace each "$" with a characte
(a carriage return) until all have been replaced. In
4055, we restore the "$" in their original spot be
continuing to the next record.

On the other hand, if you wanted to print the n
and address file in single line format, instead of inser
a `CHR$(13)` where each "$" is located, just insert a bl
space (either a `CHR$(143)` or " " would do the trick).

There are many other uses of this function which c
simplify and compact your programs considerably,
conserving valuable memory. You should become fam
with it by writing your own subroutines in various forn
and for various purposes. You will soon recognize its m
uses when you sit down to write that huge program
will do everything for you.

ARDWARE PROJECT

stall a SHIFT-lock key
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The Permanent Shift

By David Geoffroy and Norman Racine

After owning a TRS-80 Color Computer for some time, I have discovered a way of modifying computer to make the use of percase lettering more practical.

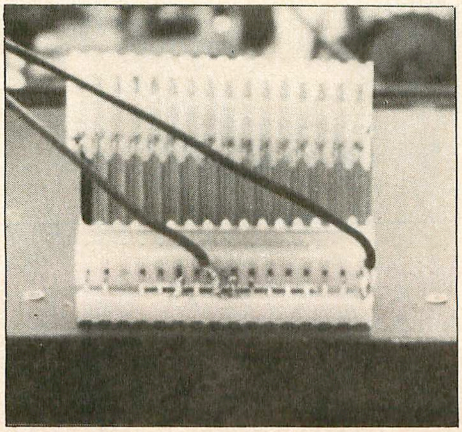
To use the computer in typewriter m, as in word processing, I noticed did not have a SHIFT-lock key, as es a typewriter. I found it was so ple to install a SHIFT-lock key I ndered why I hadn't done it sooner.

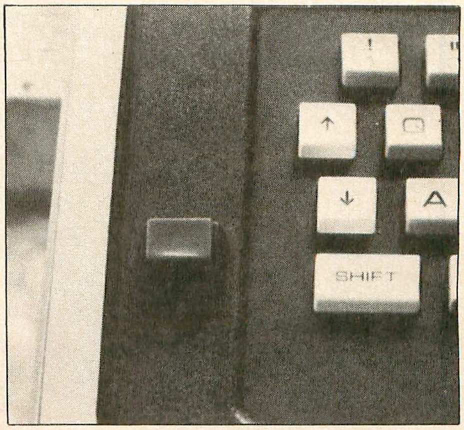
For installation, all that's needed is ush on/push off key switch (Radio ack #275-1565) and two wires. If sired, connectors (Radio Shack #64-9) can be installed on the wires to ke disconnection possible if the ver is taken off again. (A note of rning: Modification will cancel your rranty.)

First, unplug the computer and nove the screws from the bottom. It best to turn the computer upside wn to remove the screws. Next, turn computer back over, remove the ver and unplug the keyboard from main board.

There are 16 pins on the keyboard nnector. Pin #3 on the keyboard is ssing — it is an unused ground. Now der one end of the wires to pins #8 d #16 of the keyboard.

After soldering the wires to the pins, s necessary to drill a hole in the lid to the left of the left SHIFT key. Due to a post, the hole cannot be straight across from the SHIFT key, but will be just a little up. Also, the keyboard lies under the lid a little, so don't try to locate the switch too near the edge of the opening.



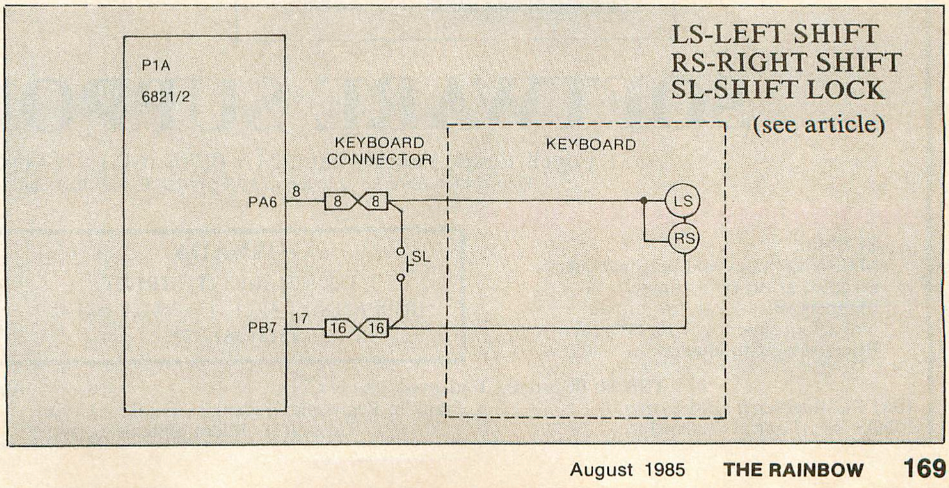


Now that the hole has been drilled, install the switch. Next, solder the wires to the switch. It makes no difference which wire goes where. Now, plug the keyboard in, put the top back on, install the screws and it's all done.

The SHIFT-lock key is useful for upper- and lowercase word processing, and it is great for listing programs. When listing programs, type `LIST`, push the SHIFT-lock key and then the ENTER key. When the '@' key is pressed, the listing will stop. By pressing any key again, and then the '@' key, there will be a few more lines listed.

A word of caution, though: The SHIFT-lock key is not labeled, but the SHIFT-lock key is red and does extend higher than any of the other keys. With a little effort it's easy to memorize where and what the key does.

(For anyone having questions concerning this project, Mr. Geoffroy may be contacted at 4700 28th Avenue, Sacramento, CA 95820.)



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avid Geoffroy is a veteran of the nited States Air Force. He lives in cramento, Calif., and works for the y repairing traffic signals. He has ned a CoCo for about four years now d enjoys it very much.

Norman Racine is interested in rdware and utility programs; he does sembly language and BASIC programing. He works for National Business stems and owns a Color Computer)

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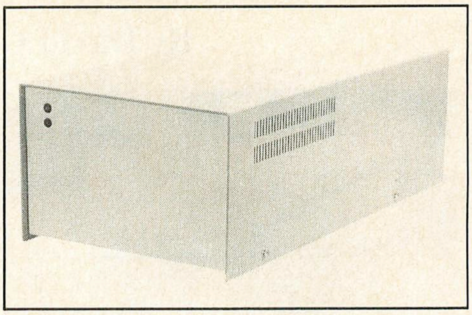

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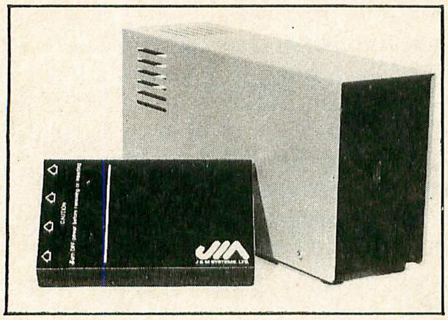

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Mastering The DRAW Statement

By Joseph Kola
Rainbow Contributing Edito

We have been working with the DRAW statement and proving to one and all that beginners can master it without special effort. Today, while you are brimming with confidence, we will create an interesting design.

As you work through this tutorial, do not hesitate to stop and run off on a tangent when you get an idea. Pursue it! You can always return to this article and pick up where you left off. Your ideas are too precious to relegate to the back of your mind. Truly, a discovery you make on your own is more important than those which you may glean from this tutorial.

Key in lines 0, 10, 500 from Listing 1. Look at Figure 1. It is a design worked out on graph paper. Each box is one unit long. The star is the point of origin. You must begin drawing the design at some location.

At the starting point, go up and to the right two units, E2. Following along, you can readily see that to advance further, you must go right two units, R2. The next line traces down and to the right. You might go two units, F2. If you do, you have a choice of traveling in three directions — up and to the right, E4; down and to the right, F4; down and to the left, G2.

Although you may create the complete design using any of the three routes, you are likely to choose E4 followed by R8F4E2R2F2G2L2H2G4L8H4G2L2H2, returning to the point of origin (Line 15 of Listing 1).

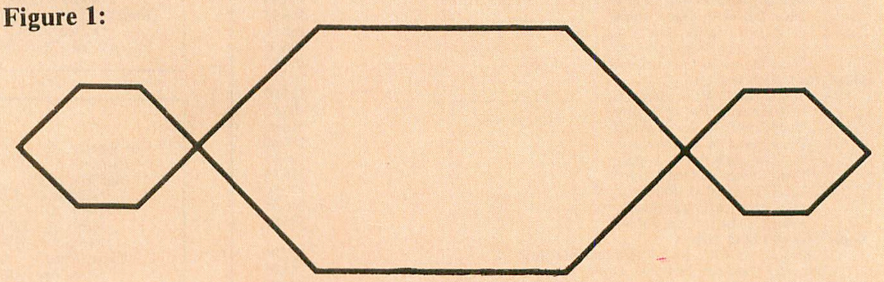
If you began with E2R2, rather than stopping at F2, you could have continued four more units in the same direction, F4. Put another way, F2F4 or, simply, but no less correct, F6. Using this alternate routing, R8E6R2F2G2L2H6L8G6L2H2, brings us to the starting point (Line 20).

Line 25 creates the same design another way. First the left unit is created (trace it out). BR6 moves us to start creating the large central unit. BR16 moves us over to create the right un In order to get back to the starti location, we must move left as ma 'B' units as we advanced to the rig BR6+BR16=BR22. The opposite dire tion of BR22 is BL22.

Key in Line 15. Type RUN, examin then hit the BREAK key. Ditto for Li 20.

Since we plan to use the desi repeatedly, we can avoid keying t same line over and over again, whi is boring and subject to error. We p the design into a string and call it wi the variable, A$. For practice, y could do this with Line 15 or 20. T instructions to CoCo are omitted Line 25 and the directions are enclos in quotation marks (" "). To make t line appear on the screen, a new lin 30, is created. This line has the instru tions to CoCo within quotation mar

Figure 1:



(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)

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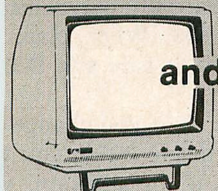

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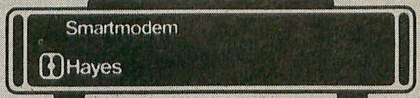

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(″ ″), telling CoCo where you want the design to appear and in what size. Concatenating '+,' A$ tells CoCo what design to display.

Key in Line 30, type `RUN`, check and then hit the BREAK key. Key in Line 40. This demonstrates how A$ is used to put a design element above the three on the screen and one below them. Now, we have five designs in a column.

Suppose we add a design at the left side. Key in: `50 DRAW"BM50,70"+A$` and type `RUN`. This location was a lucky guess! It connects nicely. We'll make two more units underneath which give us a total of three design units. Then we'll make a unit farther to the left. This means the next row will have two units side by side; one beginning at horizontal, 0, and the other at 50. Hit the BREAK key and add to the end of Line 50 `:DRAW"BM0,90"+A$+"BR 25"+A$` and `RUN`.

If you left out +"BR25", you would have lost the second unit. Delete it and see! Do you know why?

The first A$ at "BM0,90" ended at 49,90. If you merely added another +A$, it would print in the same location. How could you solve it? Move the starting location over by inserting +BR25 between the A$s.

Can you think of another way? If you edited out BL22 from the end of Line 25, and `RUN`, you will note that it must be pushed to the right to avoid overlap. If you added BR3 to the end of Line 25, it would be just right. Try it and see! Then hit the BREAK and change BR3 back to BL22.

Add to Line 50 `:DRAW"BM50, 110"+A$` and `RUN`. It is decided to have five columns, which will begin at horizontal 0, 50, 100, 150, 200.

Why did we have to move "BR25" rather than the "BR50" that you would expect? Change the +BR25 to +BR50 and see the second A$ disappear. Now `RUN`. What happened?

Moving it over 50 units printed it over the middle piece. Hit the BREAK key. To see that this is so, change +BR50 to +BR49 and `RUN`. Can you see it now? Hit BREAK and change it to +BR25.

Change the size in Line 30, S8, to S4 and `RUN`. Now change +"BR25" to +"BR50" and `RUN`.

In other words, size S8 is twice the size of S4, so the design needs to be moved over half the number of units required in S4. We don't really care *why* CoCo does what it does. All we want to know is *what* it does.

Hit the BREAK key and change L
30 back to S8 and Line 50 back
+"BR25".

Whether or not you understand wl
the correct shift is matters little. Y
can always work it out by trial and er
to get the solution.

Without peeking at the listing, (
you add four units to the right side
make it a symmetrical display? Try
and see (Line 60).

Suppose you wanted to make f
design units across the top of the scre
at horizontal 10. Line 70 shows (
way.

Suppose you wanted to make
similar five units at the bottom to ke
the symmetry of the display. Line
shows you a second way.

The technique in Line 80 is long
but it is easy to figure out. Althou
not as elegant as the solution in Li
50, it is perfectly adequate. Just as lo
as the result is satisfactory, any meth
is fine.

Line 70 was a little tricky. O/S (C
of String Space) error message forc
us to insert a pair of `DRAW` stateme
to overcome this problem.

This could be partially overcome
adding `5 CLEAR 500`. When planni
to use strings, play it safe and `CLE
500`.

Finally, in Line 70, if you change
first ':' to '+' and delete `DRAW`, you v
find it OK. But, if, in addition, y
change the second ':' to '+' and del
`DRAW`, you will get an L/S (String T
Long) error message.

It is time to introduce the 'A' opti
of `DRAW`. The 'A' option allows you
draw a design around a point (locatio
A0 prints the design as you conceiv
it; A1 prints it from the same starti
point but 90 degrees clockwise, perpe
dicular to A0 but above it. A2 pri
a further 90 degrees clockwise, radiati
in the opposite direction of A0;
places it 90 degrees further along ir
clockwise direction to be opposite t
perpendicular, A1

This may sound confusing but it
well worth the effort to add this featu
to your store of useful knowledge.

Key in lines 0, 5, 10, 20, 500 fro
Listing 2. Notice that Line 20 dra
the same element used in Listing 1.
you trace it out on graph paper, y
will discover that the starting point
at the opposite end.

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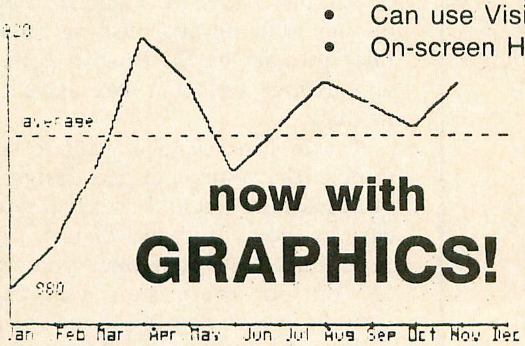

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practice creating a familiar design and stimulate you to go off into uncharted territory.

Key in the first part of Line 30: `30DRAW"S4BM128,96"+A$` and RUN. You should have the same old design unit. If in doubt, hit the BREAK key and temporarily change S4 to S8. Now RUN and you will be able to see it better. When your design is OK, change back to S4. After S4 insert A0, the first 'A' option. This is the default option. You get it whether you like it or not, unless you advise CoCo otherwise. RUN.

Now, change A0 to A1 and RUN. See? It is perpendicular. Do the same to get A2 and A3 to see all four possible options at work. If you have trouble visualizing the rotation, temporarily add:

```
25 LINE(128,0)-(128,191),PSET
```

Run through the 'A' options a few times to observe what is what. When you are satisfied, delete Line 25. Did you notice that A0 radiates out to the left of the starting location; A1 radiates upward; A2 radiates to the right and A3 radiates downward in this example?

Hit the BREAK key. Make sure that Line 30 is A0 and add at the end of it, `+"A1"+A$`. We told CoCo, in addition to the original design element, we also wanted one radiating upwards. Now, RUN and hit the BREAK key.

Let's tell CoCo to add the n
element to radiate to the right. Add
Line 30 `+"A2"+A$`, RUN and hit
BREAK key. Now, add and check
last option. Did you note when y
instructed CoCo to change the ori
tation of the design element that
information must be enclosed in q
tation marks (" ")?

Caution: A0 is not necessarily in
same quarter (radiating left), but co
be in any location depending on the c
in hand. Anyway, it isn't a bad desi
What else can we do?

You could create more designs on
blank parts of the screen. Hint: Cho
an arbitrary set of location poi
`BMx,y` and after you create the en
design, move it over to its final rest
place by trial and error.

"We don't really care
why CoCo does what i
does. All we want to
know is what it does."

Why do I frequently insist on t
and error? According to "Kolar's La
no matter how well you calculate a p
it rarely is correct because you are
to make changes, modifications
enhancements, throwing your figu
awry. So, you may just as well ease y
design into its berth. Visualize a bu
of tugs nudging and pushing an oce
liner into its berth. Push a little t
way. Nudge a bit that way. Ease it i
its dock.

Key in Line 50. We want to sup
impose the same enlarged design o
our creation. RUN and check. If you
curious, you could add one 'A' opti
at a time. Note that once you use
'A' option, every time you cha
options in each new DRAW line you m
indicate an option, even A0, the defa
option.

To illustrate the concept, delete
in Line 50 and RUN. Sorry about th
What happened was that the l
instruction CoCo received was A3
the end of Line 40. It began Line
with the downward design; then
upward; the right; and again, downwa

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created A3, the downward element, ce. Of course, you could change A3 A0 in Line 50 and correct it. Now, ou RUN, you will see that the second wnward element is facing left. But, 't it easier to insert the A0 in the t place?

At any rate, we have a pleasing ign. But, since we superimposed S12 its over S4, what do you say we superpose S8 on the whole mess and see at we come up with?

Key in Line 60 and RUN. It is really a repetition of the design in Figure 1 rotated in four directions in three sizes.

As a point of information, the instructions to CoCo could be in any order. Line 60 could have been written "BM128,96S8A0C1", just so all the hot scoop was enclosed within quotation marks (" "). C1 is the default color and is included just to illustrate the point.

Line 40 was not used. It was included for you to substitute it for A$ and cycle through the 'A' options to reinforce in your mind what happens when the basic element is radiated right instead of left. Notice that what was A2 using A$ is now A0 using B$.

This tutorial should have given you food for thought. You are invited to get out the old graph paper, plot out your own design element and run it through its four 'A' option paces. Create! Experiment!

CSAVE a copy of Listing 2 for next month. We will add the same design unit in the four diagonal directions, H, E, F and G.

isting 1: LISTING 1

```
0 'LISTING1
5 CLEAR 500
10 PMODE4,1:PCLS:SCREEN1,1
15 DRAW"S8BM100,70E2R2F2E4R8F4E2
R2F2G2L2H2G4L8H4G2L2H2"
20 DRAW"S8BM100,90E2R2F6R8E6R2F2
G2L2H6L8G6L2H2"
25 A$="E2R2F2G2L2H2BR6E4R8F4G4L8
H4BR16E2R2F2G2L2H2BL22"
30 DRAW"S8BM100,110"+A$
40 DRAW"BM100,50"+A$:DRAW"BM100,
130"+A$
50 DRAW"BM50,70"+A$:DRAW"BM0,90"
+A$+"BR25"+A$:DRAW"BM50,110"+A$
60 DRAW"BM150,70"+A$:DRAW"BM150,
90"+A$+"BR25"+A$:DRAW"BM150,110"
+A$
70 DRAW"BM0,10"+A$+"BR25"+A$:DRA
W"BR25"+A$+"BR25"+A$:DRAW"BR25"+
A$
80 DRAW"BM0,170"+A$:DRAW"BM50,17
0"+A$:DRAW"BM100,170"+A$:DRAW"BM
150,170"+A$:DRAW"BM200,170"+A$
500 GOTO500
```

isting 2: LISTING 2

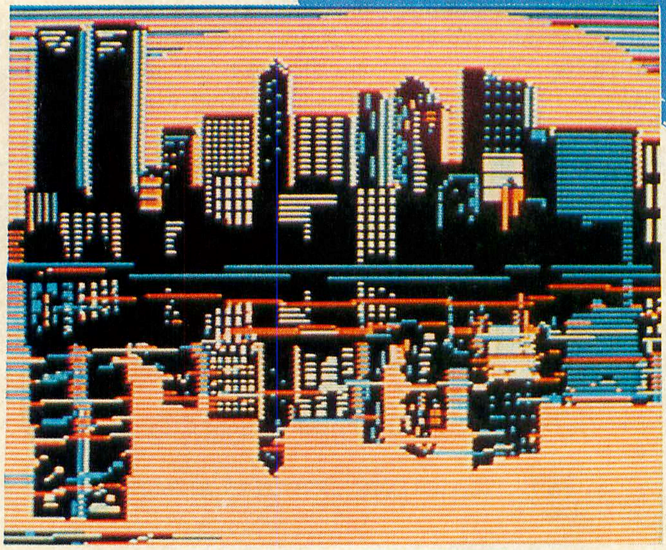
```
0 'LISTING2
5 CLEAR500
10 PMODE4,1:PCLS:SCREEN1,1
20 A$="H2L2G6L8H6L2G2F2R2E6R8F6R
2E2"
30 DRAW"S4A0BM128,96"+A$+"A1"+A$
+"A2"+A$+"A3"+A$
40 B$="E2R2F6R8E6R2F2G2L2H6L8G6L
2H2"
50 DRAW"S12A0BM128,96"+A$+"A1"+A
$+"A2"+A$+"A3"+A$
60 DRAW"S8A0BM128,96"+A$+"A1"+A$
+"A2"+A$+"A3"+A$
500 GOTO500
```

Listing 3: SHUTTLE

```
0 'SHUTTLE
10 '(C) 1984, J. KOLAR
30 PMODE3:PCLS:PMODE4
40 A=90:B=86:R=76:P=1.70
50 DIM S(7),T(7)
60 CIRCLE(8,8),8,1:CIRCLE(7,7),8
,1
61 DRAW"BM8,8NBU3L6U5R10D10L10U5
"
70 GET(0,0)-(16,16),S,G
72 CIRCLE(38,8),6,1:PAINT(40,8),
1,1
73 GET(30,0)-(46,16),T,G
80 PCLS:SCREEN1,1
90 FOR Q=.15 TO .05 STEP -1
100 FORZ=1TO6.55 STEPQ
110 C=Z:C=40-(C)*P*270-R^2
115 K=LOG(C^2)*COS(R)/COS(R^2)
120 X=INT(A-6+R*COS(C)):Y=INT(B-
8+R*SIN(K))
130 PUT(X+36,Y+10)-(X+52,Y+26),S
,OR
135 PUT(X+36,Y+10)-(X+52,Y+26),T
,AND:SOUND100,1
140 X=INT(A-6+R*SIN(K)):Y=INT(B-
8+R*COS(C))
150 PUT(X+36,Y+8)-(X+52,Y+23),S,
 OR
155 PUT(X+36,Y+8)-(X+52,Y+23),T,
AND:SOUND100,1
160 NEXT Z,Q
170 PLAY"V20O3L8EEFFABO4L16CCO3F
AL8FFAAL4FEL2CP4V25L8FFAABO4CL16
EEDDL8CCO2AAL4FEL2CP4V20O2L8EEFF
AAO3V25L16CCO2BAV20L8FFDDL4CV15O
1BO2DL2C"
180 PCLS:GOTO90
```

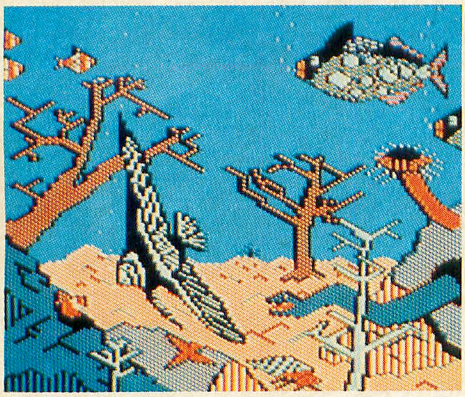
The CoCo Galler

1st PRIZE



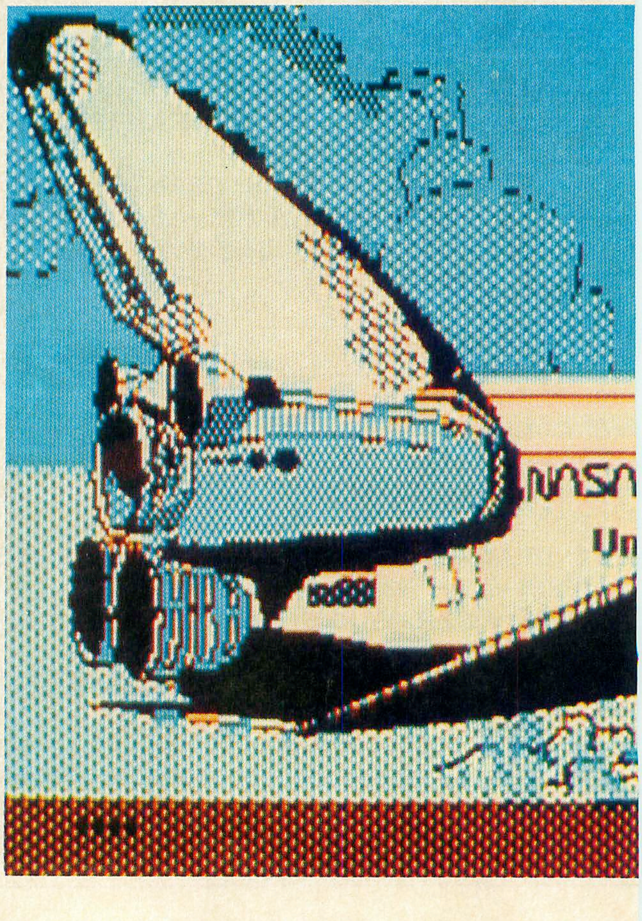
Robert Centurelli
Skyline
This month's first prize winner is a serene reflection of the Big Apple drawn using *Graphicom II*. Robert lives in Plainville, Conn.

2nd PRIZE

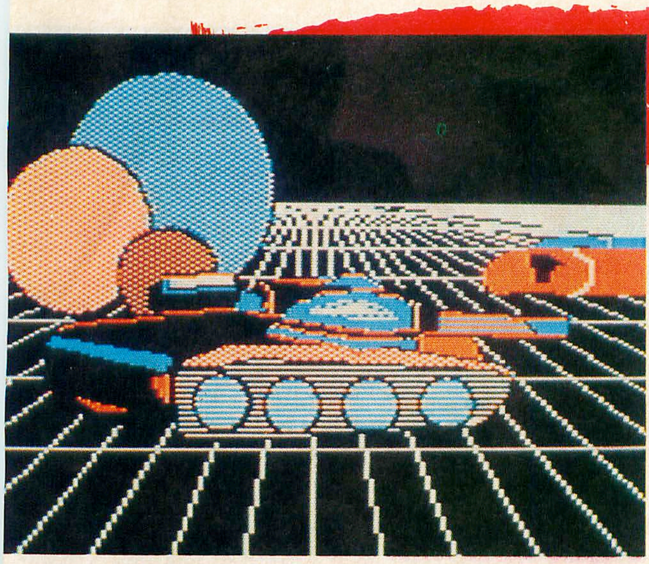


John Poole
A Reef Scene
From Titusville, Fla., John sends the Gallery a subaqueous second prize winner drawn using *Graphicom II*'s pan and zoom mode.

3rd PRIZE



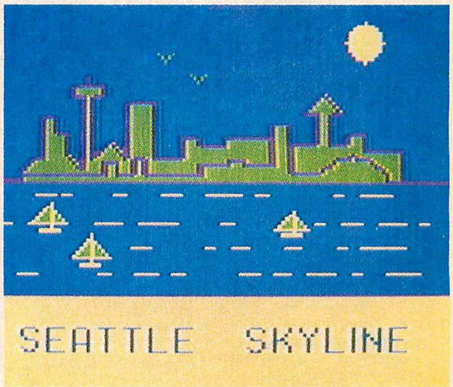
Jeff Steinmetz
Shuttle
Jeff lives in Minneapolis, Minn., and used *CoCo Max* to draw a profile of the Space Shuttle using the upper and lower portions of the *CoCo Max* screen.



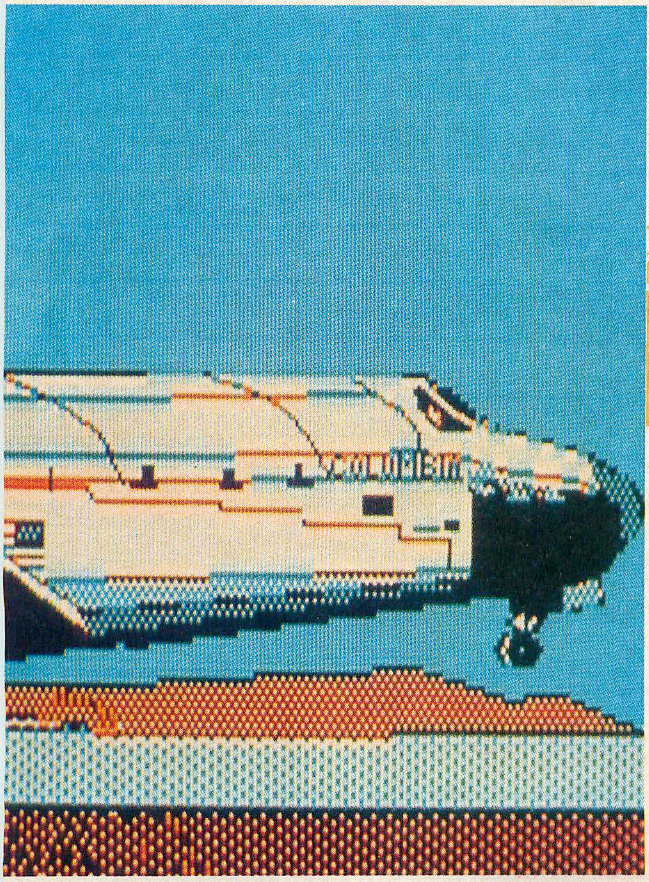
HONORABLE MENTION

Charlie Fulp
CompuWar
Charlie drew the grid and light cycles of his futuristic warscape using Extended BASIC. The tank and spheres were drawn using *CoCo Max*. Charlie lives in South Boston, Va.

HONORABLE MENTION



Betty Ann White
Seattle
Betty Ann used the `DRAW`, `LINE` and `PAINT` commands of `PMODE4` to create this stylized portrait of the Emerald City's skyline on a sunny day. Betty Ann lives in Kirkland, Wash.



Send your entry on
either tape or disk to:
CoCo Gallery
THE RAINBOW
P.O. Box 385
Prospect, KY 40059
Attn: Monica Dorth

Be sure to send a cover letter with your name, address and phone number detailing how you created your picture (what programs you used, etc.), how to display it and a few facts about yourself.

Please don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere.

We will award a first prize of $25, a second prize of $15 and a third prize of $10. Honorable mentions also will be given.

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's Scoreboard column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

★ Current Record Holder

ASTRO BLAST *(Mark Data)*
35,600 ★Chris Morris, Colonial Heights, VA

ATOM *(Radio Shack)*
41 ★Erik Huffman, Delran, NJ

BASEBALL *(Radio Shack)*
525-50 ★Bob Dewitt, Blue Island, IL

BATS AND BUGS (THE RAINBOW)
24,600 ★Michael Rosenberg, Prestonburg, KY
8,450 Bill Martin, Myrtle Beach, SC
7,200 Lezlee Bishop, Salt Lake City, UT
5,220 Brian Cook, Dixon, IL
4,000 Jon Hobson, Plainfield, WI

BATTLE OF MIDWAY *(Ark Royal)*
1009:259 ★Matt Hazard, Columbia Station, OH

BLOC HEAD *(Computerware)*
41,975 ★Michael Hebb, Victoria, Australia
27,000 Rodney Mullineaux, Gig Harbor, WA
23,500 Paschal Wilson, Kentwood, LA

BREWMASTER *(NOVASOFT)*
98,875 ★Chris Cope, Central, SC
9,150 David Hart, Salt Lake City, UT

BUSTOUT *(Radio Shack)*
15,520 ★Brett DuPont, Oregon, OH
14,500 Wayne Dewitt, Blue Island, IL
13,500 Ken Dewitt, Blue Island, IL

BUZZARD BAIT *(Tom Mix)*
3,091,700 ★Blossom Mayor, East Greenbush, NY

CALIXTO ISLAND *(Mark Data)*
115 ★Glenn Della-Monica, Sacramento, CA

CANYON CLIMBER *(Radio Shack)*
286,800 ★Beverly Herbers, Placentia, CA
162,500 Michael Sileo Jr., Glendale, NY
140,500 Todd Wall, Durham, NC
128,200 Stephane Asselin, Baie-Comeau, Quebec
8,900 George Frausto, Blue Island, IL

CAVERN COPTER (THE RAINBOW)
2,431 ★Jay Beam, Louisville, KY
1,535 Pierre-Jean Douillard, Granby, Quebec
1,245 Sean Conner, Summit, NJ
1,213 Doug Schwartz, Glendale, AZ
968 Michael Mefferd, Wren, OH

CHAMBERS *(Tom Mix)*
104,200 ★Blossom Mayor, East Greenbush, NY

CLOWNS & BALLOONS *(Radio Shack)*
15,130 ★Brett DuPont, Oregon, OH

COLOR BASEBALL *(Radio Shack)*
668-0 ★Christian Roch, Granby, Quebec
254-0 Chris Reynolds, Richmond, KY
250-0 Rob Mowery, Robinson, PA
167-0 Keith Townsend, Kokomo, IN
158-0 Bart Ankrom, Atlanta, KS
158-0 Toby Jacobs, Bellefontaine, OH

COLOR CAR *(NOVASOFT)*
525,650 ★Dan Bouges, Niantic, CT
154,600 Scott Cunningham, East Lyme, CT

COLORPEDE *(Intracolor)*
133,036 ★Mariano Frausto, Blue Island, IL
23,450 George Frausto, Blue Island, IL

COSMIC INVADERS *(Spectral Associates)*
16,400 ★Mariano Frausto, Blue Island, IL

CRYSTLE CASTLES *(ThunderVision)*
83,297 ★Craig Hoffmann, Kenosha, WI

CU*BER *(Tom Mix)*
19,550 ★Rodney Mullineaux, Gig Harbor, WA

DALLAS QUEST *(Radio Shack)*
93 ★Robert Sunderland, Sacramento, CA

DEFENSE *(Spectral Associates)*
56,720 ★Brett DuPont, Oregon, OH

DEMOLITION DERBY *(Radio Shack)*
119,800 ★David Oelhaupl, Calgary, Alberta
109,100 Charles Bowen, Imperial Beach, CA
79,100 David Close, Springfield, VA
44,000 Joseph Dehn, Tucson, AZ
32,900 Les Dorn, Eau Claire, WI

DEMON II (THE RAINBOW)
21,925 ★Keith Schuler, Merritt Island, FL
12,475 Rhett Bagnall, Saskatoon, Saskatchewan
10,075 Frank Canepa III, Santurce, Puerto Rico
1,800 Bryan Ecker, Lusby, MD

DEVIL ASSAULT *(Tom Mix)*
64,741 ★Eugene Little, Pierceland, Saskatchewan

DOODLEBUG *(Computerware)*
825,370 ★Susan Ballinger, Uxbridge, Ontario
66,770 Sean Colsen, East Lyme, CT

DOUBLE BACK *(Radio Shack)*
337,990 ★John Denn, Hobart, IN
286,570 Timothy Bishop, Jacksonville, FL
268,350 Marc Plouffe, Williston, VT
258,400 Alfredo, New York, NY
235,110 Les Dorn, Eau Claire, WI
219,720 Jeff Lahaie, Essex Jct., VT
181,150 Michael Brennan, Calgary, Alberta

DOWNLAND *(Radio Shack)*
20,900,400 ★Adam Petersen, Portland, OR
68,345 Alain Cyr, Valcourt, Quebec
67,456 Chris Mitchell, Byron, GA
67,141 Cliff Farmer, McGregor, TX
66,145 Jeanine McCuen, Rutland, MA

DRACONIAN *(Tom Mix)*
358,550 ★Jamie Spreng, Dartmouth, Nova Scotia
241,290 Kristopher Staller, Ft. Wayne, IN
206,240 Joe Nauman, Sacramento, CA
136,400 Tony Cross, New South Wales, Australia

FOODWAR *(Arcade Animation)*
165,960 ★Chris Cope, Central, SC
74,120 Jim Partridge, Clinton, CT

FROGGER *(Cornsoft)*
15,860 ★Erik Huffman, Delran, NJ
12,000 Nicole Freedman, Wellesley, MA

GALAGON *(Spectral Associates)*
219,670 ★Brian Wagner, Lawrence, KS
214,920 Tony Smith, Gig Harbor, WA
185,740 Arnold Snitser, Los Angeles, CA
144,710 Brendan Smith, Coral Springs, FL
135,180 Mario Asselin, Baie-Comeau, Quebec
97,790 Miriam Kavis, Los Angeles, CA

GHOST GOBBLER *(Spectral Associates)*
48,200 ★Steven Allen, Sharpsburg, MD
34,270 Glen Bilodeau, Otterburn Park, Ontario
32,260 Jean-Pierre Boisclair, Asbestos, Quebec

GLAXXONS *(Mark Data)*
19,146 ★Terry Moore, St. Catherines, Ontario

GOLD RUNNER *(NOVASOFT)*
144,150 ★Chris Cope, Central, SC
65,800 Dan Bouges, Niantic, CT
65,800 Sean Colsen, East Lyme, CT

GUARDIAN *(Quasar Animations)*
4,350 ★Jason Forbes, Mexico, NY

ICEMASTER *(Arcade Animation)*
14,525 ★Jean-Pierre Boisclair, Asbestos, Quebec

THE INTERPLANETARY FRUIT FLY (THE RAINBOW)
37,000 ★Scott Perkins, Port Orange, FL
27,500 Les Dorn, Eau Claire, WI
26,000 Eric Foss, Cochrane, Alberta
25,500 Michele Gaboriault, Foxboro, MA
25,000 Andrew Bartels, Sulphur, OK

THE JUNGLE (THE RAINBOW)
668,690,000 ★Jeff Lawrence, Cambridge, Ontario
459,351,041 Denise Morin, Hudson, MA
4,560,144 Jon Hobson, Plainfield, WI
4,134,000 Brandon Duncan, Benton, KS
1,659,162 Jay Andraschko, Yuma, AZ

JUNIOR'S REVENGE *(Computerware)*
8,020,000 ★Ian Stewart, Lynwood, Perth-Australia
3,386,000 Chris Morris, Colonial Heights, VA
786,300 Richard Wiseman, Marion, OH
205,700 Tony Smith, Gig Harbor, WA
112,300 Jeff McClure, Washington, PA

JUNKFOOD (THE RAINBOW)
1,187,520 ★Larry Thomson, Menominee, MI
1,079,600 Jean-Francois Morin, Loretteville, Quebec
338,930 Jon Hobson, Plainfield, WI
309,460 Shirley Black, Quinton, AL
206,940 Rhett Bagnall, Saskatoon, Saskatchewan
119,200 Annemarie Stoer, Deventer, The Netherlands
112,720 Jamie Spreng, Dartmouth, Nova Scotia

KATERPILLAR II *(Tom Mix)*
156,317 ★Uwe Steingens, Essen, West Germany
135,467 Thomas Tiggelbeck, Essen, West Germany
97,735 Sabine Bergholz, Essen, West Germany

KEY BOMBER (THE RAINBOW)
29,052 ★Tony Boring, Armagh, PA

THE KING *(Tom Mix)*
1,670,900 ★Yolanda Farr, Sayre, PA
1,003,400 Tim Rueb, Atlanta, GA
543,400 Doug Tower, Colonial Heights, VA
337,800 Kirk Carter, Cooper City, FL
301,100 Tom Harrison, Pittsfield, MA
26,450 Ken Dewitt, Blue Island, IL

KRON *(Oregon Color Computers)*
33,000 ★Chris Cope, Central, SC

LANCER *(Spectral Associates)*
224,000 ★Tom Mahoney, Centerport, NY
208,350 David Carver, Galena, OH
165,750 Glenn Dolick, Burlington, Ontario
162,300 Bryan Bell, South Lyon, MI
157,500 Dan Bouges, Niantic, CT
110,350 Chip Beasley, Colonial Heights, VA

LASERWORM & FIREFLY (THE RAINBOW)
25,776 ★Jason Forbes, Mexico, NY
19,780 Jim Partridge, Clinton, CT
13,834 Dean McWhorter, Argyle, NY

LUNAR-ROVER PATROL *(Spectral Associates)*
136,700 ★Lori Day, Arlington, TX

MADNESS & THE MINOTAUR *(Radio Shack)*
240 ★Chris Mitchell, Byron, GA

MARATHON (THE RAINBOW)
307,790 ★James Sheedy III, Tonawanda, NY

MAZELAND *(Chromasette)*
21,060 ★Todd Knapp, Prairie du Chien, WI
8,550 Brian Cook, Dixon, IL

MEGA-BUG *(Radio Shack)*
7,930 ★Ron Haines, Nepean, Ontario
3,998 Christopher Romance, Massapequa Park, NY
3,693 Jim Partridge, Clinton, CT
1,085 Larry Cowles, Westport, WA

MICROBES *(Radio Shack)*
491,100 ★David & Alan Heckler, Hartselle, AL
237,560 Todd Bartels, Coal Valley, IL
178,550 Apollo Latham, Rich Square, NC
144,350 Theodore Latham Jr., Rich Square, NC
101,960 David Barnekow, Elkhorn, WI
97,950 Ivan Catlett, Laguna Hills, CA

MISSILE BARRAGE (THE RAINBOW)
2-1 ★Joe Calcaterra, Ridgewood, NY

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316,000 ★Mohamed Behery, Clemson, SC
215,110 Steven Allen, Sharpsburg, MD
205,180 Richard Fiore, Clemson, SC
200,020 Terry Steele, Summerfield, NC
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60,280 ★Rodney Mullineaux, Gig Harbor, WA
. DIG *(Computerware)*
259,750 ★Ellen Ballinger, Uxbridge, Ontario
100,650 Biagio Di Lorenzo, Montreal, Quebec
001,100 Ross & Daniel Mehlman, Todd Boehm, Nashville, TN
875,870 Ann-Marie MacKay, Port Hardy, British Columbia
520,650 Thomas Henry, Boca Raton, FL
531,570 Tony Cross, New South Wales, Australia
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981,700 ★Jon Blow, San Diego, CA
345,100 Brian Wolfgram, Freeland, MI
285,600 Stephen Zamonski, Ewing, NJ
137,000 David Craft, Roanoke, VA
114,800 Barry Stanton, North East, PA
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23,730 ★Brian Wolfgram, Freeland, MI
14,663 Aaron Repath, Tucson, AZ
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14,425 ★Alfredo, New York, NY
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48,250 ★Paul Wagorn, Carp, Ontario
28,330 Kirby Smith, York, PA
22,670 Gary Bedford, Piqua, OH
14,550 Matt Funk, Hanover, PA
14,540 Michael Nelson, Lancaster, PA
ANTOM SLAYER *(Med Systems)*
1,326 ★Susan Ballinger, Uxbridge, Ontario
124 Chris Morris, Colonial Heights, VA
PELINE (THE RAINBOW)
1,332 ★Kent Prehn, Carol Stream, IL
1,162 Mike Garozzo, Morrisville, PA
925 Andy Green, Whitehall, PA
483 Susan Ballinger, Uxbridge, Ontario
405 Joe Bironas, Crestwood, KY
ANET INVASION *(Spectral Associates)*
59,600 ★Terry Steele, Summerfield, NC
52,450 Ian Loeppky, Blumenort, Manitoba
32,350 Susan Ballinger, Uxbridge, Ontario
10,750 Saul Kirsch, Ra'anana, Israel
8,950 Michael Derman, Tel-Aviv, Israel
LARIS *(Radio Shack)*
171,862 ★Thomas Levasseur, Rockland, ME
133,726 Ed Meyer, Vancouver, British Columbia
112,535 Brett Ankrom, Atlanta, KS
97,450 Jay Beam, Louisville, KY
87,910 Ron Sujkowski, Bay City, MI
LTERGEIST *(Radio Shack)*
6,000 ★Billy Fairfull, Charleston, SC
4,900 Kristine Haines, Nepean, Ontario
4,885 Frank Canepa III, Santurce, Puerto Rico
4,830 Lisa Ballinger, Uxbridge, Ontario
4,830 Joel Peacock, Thousand Oaks, CA
4,200 Bryan Ecker, Lusby, MD
OYAN *(Datasoft)*
,785,000 ★Ben Collins, Clemson, SC
,546,000 Jeff Connell, Winona, MN
,250,350 Richard Hawkins, Cleveland, TN
978,450 Christopher Romance, Massapequa Park, NY
900,250 Daniel Belisle, Montreal, Quebec
140,450 Beverly Herbers, Placentia, CA
111,000 Nancy Herbers, Placentia, CA
80,150 Bart Nigro, Tempe, AZ
8,500 Hiram Esparza, Blue Island, IL
4,600 George Frausto, Blue Island, IL
PCORN *(Radio Shack)*
45,210 ★Mike Norris, Columbia, SC
41,910 Nicole Freedman, Wellesley, MA
36,500 Barry Stanton, North East, PA
34,900 William Blaine III, Gallipolis Ferry, WV
32,430 Chris Bosl, Temple, TX
26,360 Ivan Catlett, Laguna Hills, CA
16,490 Frank Wood III, Niverville, NY
ROJECT NEBULA *(Radio Shack)*
2,005 ★Christopher Romance, Massapequa Park, NY
YRAMID *(Radio Shack)*
220/112 ★George Fairfield, Victoria, British Columbia
220/112 ★David Oelhaupl, Calgary, Alberta
220/114 Chris Mitchell, Byron, GA

Q-NERD (THE RAINBOW)
1,958,950 ★Bruce Baltzer, Hanover, Ontario
61,290 Sean Conner, Summit, NJ
QUIX *(Tom Mix)*
907,320 ★Andrew Norrie, Mississauga, Ontario
525,633 Clayton Foxworth, Florence, SC
447,353 Stephane Asselin, Baie-Comeau, Quebec
323,373 Jean-Francois Lauzier, Asbestos, Quebec
271,965 Nicole Freedman, Wellesley, MA
RAAKA-TU *(Radio Shack)*
50 ★Ryan Devlin, Louisville, KY
50 ★Todd Knapp, Prairie du Chien, WI
40 Robbie Haines, Nepean, Ontario
RACER (THE RAINBOW)
159.9 ★Frank Canepa III, Santurce, Puerto Rico
90.2 Chris Neal, Wabash, IN
RADIO BALL *(Radio Shack)*
4,510,740 ★Les Dorn, Eau Claire, WI
3,708,810 Stephen Zamonski, Ewing, NJ
1,738,150 Mickey Emberton, Indianapolis, IN
1,629,200 Benoit Lareau, Montreal, Quebec
1,511,640 Kelly Dion, Cap-de-la-Madeleine, Quebec
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5,257,295 ★Gary Bedford, Piqua, OH
73,240 William Blaine III, Gallipolis Ferry, WV
RETURN OF THE JET-I *(ThunderVision)*
538,432 ★Matt Griffiths, Stilwell, KS
429,160 Jean-Francois Bruneau, St-Hubert Quebec
203,500 Jamey Maumus, New Orleans, LA
REVERSE (THE RAINBOW)
7 ★Jon Hobson, Plainfield, WI
ROAD RACE (THE RAINBOW)
91.7 ★Bill Martin, Myrtle Beach, SC
576.6 Eric Clarkson, Missouri City, TX
706.1 Michael Hebb, Victoria, Australia
1212.4 Michael Martens, Wausau, WI
2158.5 Steven Roth, Fannystelle, Manitoba
RUN FOR YOUR LIFE (THE RAINBOW)
20,000 ★Ryan Devlin, Louisville, KY
SAILOR MAN *(Tom Mix)*
596,700 ★Jeff Picketts, Brantford, Ontario
570,500 Aaron Samuels, Monument, CO
535,900 Scott Sherman, Woodstown, NJ
488,600 Paul Kenyon, Phoenix, AZ
435,700 Andy Dater, Medford, OR
232,000 Brian Baggett, Maumee, OH
SANDS OF EGYPT *(Radio Shack)*
80 ★John Allocca, Yonkers, NY
80 ★Bob Dewitt, Blue Island, IL
82 Jeff McKay, Travis AFB, CA
97 Phill Zarfos, Dallastown, PA
98 Aaron Durkee, Lansing, MI
102 Clyde Siverd Jr., Saratoga Springs, NY
SEA DRAGON *(Adventure International)*
39,030 ★Brian Wolfgram, Freeland, MI
12,000 Ken Dewitt, Blue Island, IL
SHAMUS *(Radio Shack)*
62,940 ★Jon Blow, San Diego, CA
SHENANIGANS *(Mark Data)*
96 ★N. Wakelin, Mt. Lebanon, PA
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SHOOTING GALLERY *(Radio Shack)*
227,840 ★Cliff Farmer, McGregor, TX
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01:12 Sean Conner, Summit, NJ
05.85 John Hokpins, Greenville, SC
SLAY THE NERIUS *(Radio Shack)*
472,667 ★Jim Herbers, Placentia, CA
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1:24 ★Luanne Ashby, Phoenix, AZ
1:26 Dan Sobczak, Mesa, AZ
1:37 Susan Ballinger, Uxbridge, Ontario
1:50 Andy Green, Whitehall, PA
1:59 Baiju Shah, Deep River, Ontario
SOLO POKER *(Datasoft)*
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690 Robert Peterman Jr., Newton, TX

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101,430 David Barnekow, Elkhorn, WI
73,950 Lori McCullar, Brazil, IN
62,390 Andrew Lawrence, Cambridge, Ontario
39,210 Alfred Silva, Cranston, RI
20,580 Matt Shaffer, Reading, PA
STORM ARROWS *(Spectral Associates)*
263,850 ★Arnold Snitser, Los Angeles, CA
TEMPLE OF ROM *(Radio Shack)*
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620,800 Rhea Jarrard, Olympia, WA
463,400 Glenn Alfrey, Olympia, WA
288,500 Carol Elliot, O'Leary, Prince Edward Island
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68,390 Jamie Spreng, Dartmouth, Nova Scotia
27,890 Jason Forbes, Mexico, NY
24,770 Stephanie Michel Morgan, Centerville, OH
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— Debbie Hartley

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

IN 'SEARCH' OF THE RIGHT NAME

Scoreboard:

In the "Scoreboard" column, you have both *Sea Quest* and *Sea Search* listed. These are both the same game, and should only be listed once. I guess Mark Data changed the name for some reason. The current name is *Sea Search*.

Brett Noble
Redlands, CA

Editor's Note: Mark Data did change the name. From now on, *Sea Quest* will be referred to as *Sea Search*. Thank you, Brett.

UNTRUE STATEMENT

Scoreboard:

In a recent issue of RAINBOW, I noticed someone stated that the scepter was useless in *Pyramid*. You can wave the scepter at the bottomless pit and a bridge will span across the pit to the hall of gods.

I also need help in killing the gargoyle with the candle in *Raaka-Tu*. Please send any information to 1615 Highland Ave., 53545.

Todd Harris
Janesville, WI

KEY TO TREKBOER

Scoreboard:

Here are a few tips for those of you having trouble with the Adventure *Trekboer*, by Mark Data Products.

To open the cabinet you must get the key from the manual. Once you open the cabinet, you must examine it three times to get everything out.

When you are on the planet Aridak (the desert planet), to get the liquid, type `GET LIQUID WITH BEAKER`. To find the wrecked starship when you arrive through the teleport, type S, S, S, S, E. To go back to the teleport, type N, E, W, N.

I have almost finished *Trekboer*, but I can't get out of the large underground complex on the Garden planet. I would appreciate it if someone could tell me.

If anyone needs some tips or all the answers to the following Adventures, write to 181 Geoffrey Rd., Chittaway Pt., Wyong 2259. The games are *Pyramid, Bedlam, Madness and the Minotaur* and *Trekboer*.

Oh! What is the canteen for?

Tony Cross
New South Wales, Australia

HORSIN' AROUND

Scoreboard:

The games *Sands of Egypt* and *Dungeons of Daggorath* are driving me crazy! In *Sands of Egypt*, I can't even find the pool. Can anyone please send me the solutions? They would be greatly appreciated. My address is 622 Perdido Dr., 75043.

Here's a hint for those of you with *Dallas Quest*. Start the game and get the bugle. Go east until you reach the horse. Examine the horse and the tree. Then examine Lucy and ride the horse; that will give you the first clue. Go back down and get the shovel (go north until you reach the barn).

When you're in the pasture, just move around until the cattle start to stampede toward you. When that happens, play your horn and dig up whatever the cattle uncovered. After that, go into the study and then the grass field and find your way to the airfield. The rest is up to you!

Eric Hedstrom
Garland, TX

Scoreboard:

For anyone who is having trouble with *Dungeons of Daggorath*, here are some hints. Watch the speed at which the monsters travel and time your hits so the computer will hit them the moment they enter your block. It also helps to keep useless treasure, such as dead torches, in front of you.

Also, I have found another ring on the fourth level. It's a Joule ring. I won't tell you to what it incants, but to find out, just look in your old, trusty "Webster's Dictionary."

The Elvish sword and Mithrel shield are also found on the fourth level. To get these, kill all the scorpions and wraiths first, then go after the massive galdrogs who carry the sword, shield, Joule ring and a Seer scroll.

I hope I have been of help. For m information or help with *Black Sanctum* *Raaka-Tu*, send a SASE to 210 Spri Hollow Ln., 43081.

Chris D
Westerville, (

Scoreboard:

If you are having trouble with *Sands* *Egypt*, here are a couple of hints.

To drain the pool you need the scept which is at the base of the pyramid. If you made it to the underground river, you ha to go to the boat and type `FLOAT BOA` You need the rope to tie the boat up the archway and you need the shovel to r the boat.

For those of you who are having troul with the mummy, the first thing you do or you get into the archway is type `TRANSLA` `HIEROGLYPHICS`, then place the scepter the mummy. The place should shake a reveal a crack in the wall. Get the ladd then go back to the archway.

Does anyone know how to find the l treasure in *Sea Search*? I have already fou the ring, the anchor, the silver and the pea Somebody please help!

I have solved *Shenanigans, Black Sanctu* and *Dallas Quest*. If you need help se a SASE to 19695 Barnett Rd., 70791.

Dustin Maxfie
Zachary, I

Scoreboard:

For anybody who plays Adventures, he are some of the games I have solved: *Bla* *Sanctum, Sea Search, Calixto Islan* *Shenanigans* and *Bedlam*.

In *Shenanigans*, when you are in the cav and you hear a voice saying "Sean," ty `SEAN`.

For *Bedlam*, try putting the pill in t meat and then give it to the dog. Also, wh you stumble over something in *Sea Searc* type `GET SHOVEL`.

For any more help, write to me at R 6, Box 293, 26505.

Doug Wilbu
Morgantown, W

CAR STOPPER

oreboard:
n *Poltergeist*, from Radio Shack, on the
eens with the large housing development
ou hold the joystick button down while
s being drawn up (before the cars come
) and keep it held down, the cars will
ver show up.

Glen Button
Cheshire, CT

FREEBIES

oreboard:
have been noticing that more and more
ople are writing in with questions on how
solve certain Adventures. There are also
ople who offer solutions for money. Well,
oo am a CoCo Adventure addict, and
ave solved quite a few. They include:
dlam, Black Sanctum, Blackbeard's
and, Calixto Island, Dallas Quest, Major
ar, Pyramid, Raaka-Tu, Sam Diamond,
m Sleuth, Sands of Egypt, Sea Search,
enanigans, Syzygy, To Preserve Quandic
Trekboer. If any of you would like help
any kind, write to me at 110 Ashley Drive,
531. I can also be reached at (803) 654-
42, but please call after 6 p.m. I don't
h that you send money, but a SASE
uld be nice.
f there is anyone out there who has solved
daron, I would appreciate it if you would
e me some hints. I would also love to
ar from any of my fellow CoCo-nuts.
ppy Adventuring!

John Allen
Clemson, SC

DARTH LIVES ON

oreboard:
need help with the 3-D graphics
lventure *Syzygy*, from Spectral Associates.
an just about finish the game, except I
't kill Darth Vader and I can't get past
second force field on one of the lower
els (I believe it is Level 3). I can get all
the treasure, including the communicator,
t I can't seem to kill Darth Vader. Anyone
o can help, or needs help, please call me
(203) 634-0680, or write to me at 31 Fiesta
gts., 06450.
Here is a hint. You need the string and
blanket to survive the fall from the cliff.

Mike Sengstock
Meriden, CT

SHENANIGANS

Scoreboard:

I need help on *Shenanigans*. Any answers or solutions would be appreciated. Every time I go into the pub, I get kicked out.

I can help on *Calixto Island*. My phone number is (602) 889-7551, or you can write to 333 W. Dakota St., 85706.

Aaron Repath
Tucson, AZ

Editor's Note: No shirt, no shoes, NO SERVICE!

Scoreboard:

I need help with the Adventure game *Shenanigans*. I can't seem to get past that stupid snake in the cave. If anyone can help me, please write to 8113 E. Whitton Ave., 85251.

Chuck Kiefer
Scottsdale, AZ

Editor's Note: Examine the clover fields more closely.

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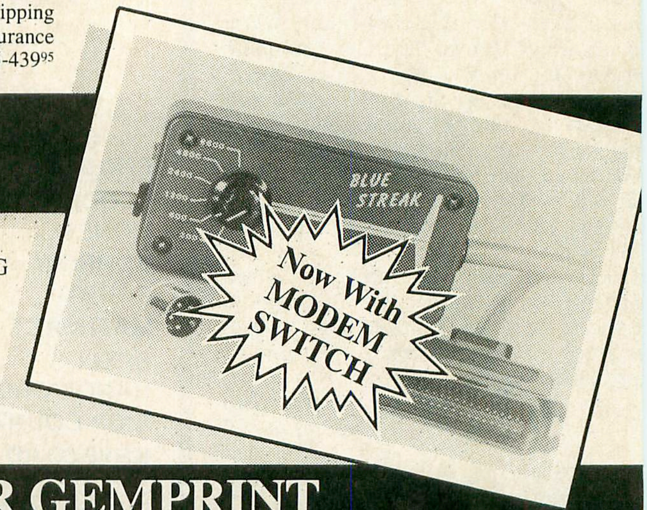
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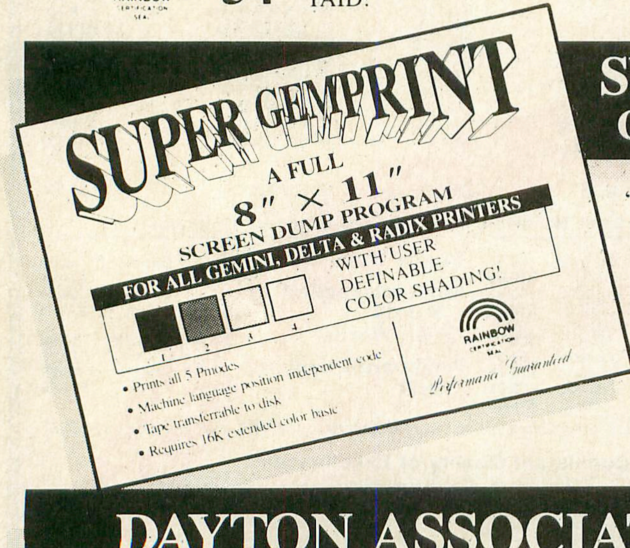
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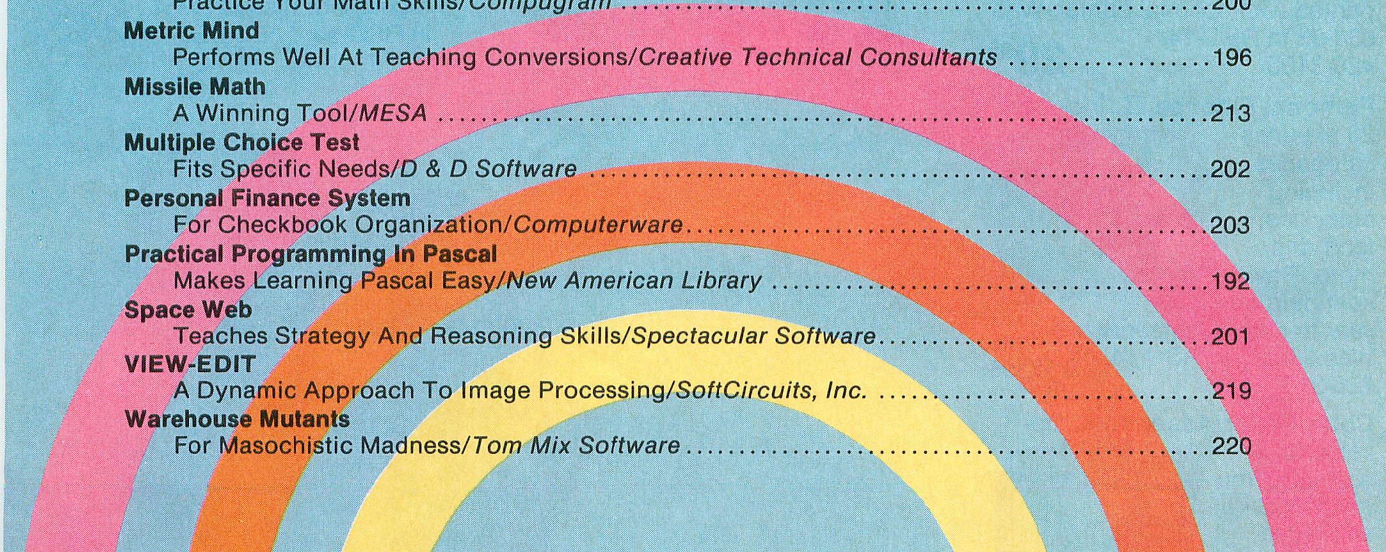

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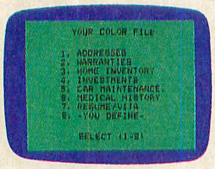

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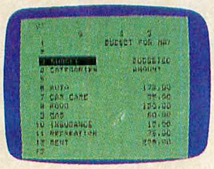

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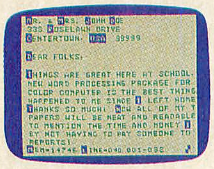

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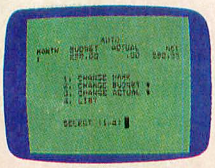

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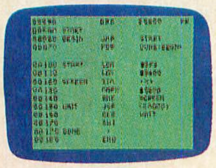

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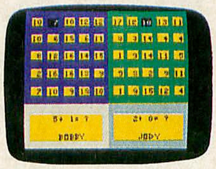

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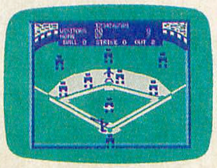

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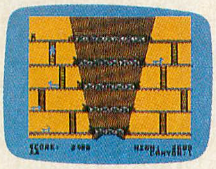

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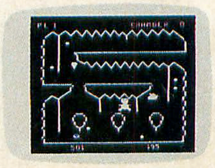
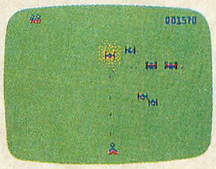
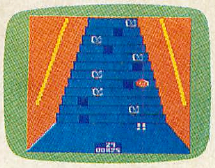


Galactic Attack.* Enemy spaceships bomb your defense shields. If you destroy this squadron, the enemy reverts to a deadly night attack. Was $24.95 in RSC-14. #26-3066 **19.95**



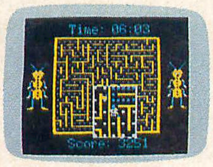
Poltergeist. Based on the hit movie. Search for clues and face the poltergeist. Not for parents or others easily frightened. Was $29.95 in RSC-14. #26-3073 **24.95**



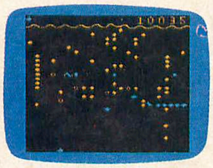
* Joysticks required.
** Cassette recorder required.
*** Joysticks and recorder required.

Color Computer at New Low Prices!

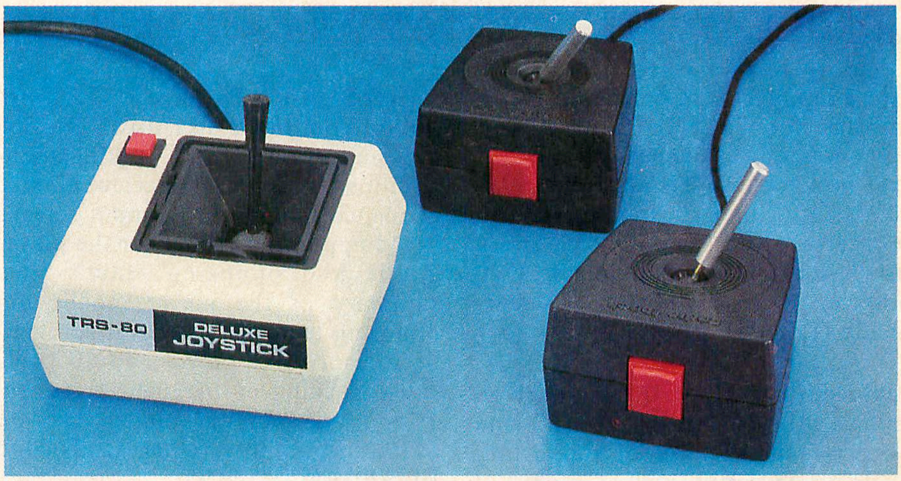
Mega-Bug.* A maze of fun! Try o lose the lit- le "buggers" ot on your rail. You an't stop. verywhere ou go, on very turn, there's more of them! xcellent color graph- cs. Was $29.95 in SC-14. #26-3076 19^{95}



lay the Nerius.* Fast action is eeded to ave your ubmarines rom deadly tarfish and he ancient ea creature —Nerius. Was $24.95 n RSC-14. #26-3086 19^{95}



lowns and Balloons.* A real ircus act. Jse your afety net to ounce the lown up and own to pop he balloons verhead! Be careful—don't let he clown fall. Was $29.95 n RSC-14. #26-3087 19^{95}

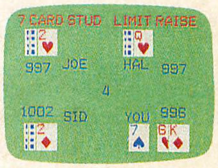


Deluxe Joystick. Get accurate cursor control and quicker response. Dual-axis trim controls. Was $39.95 in RSC-14. #26-3012 29^{95}

Joysticks. Two controls with full 360° movement! Single-shot button. A "must" for selected games. Was $24.95 in RSC-14. #26-3008 (pair) 19^{95}

Cyrus. A chess program with beginner to tournament skill levels. You can take back a move or reject the computer's move and force it to play again. Was $24.95 in RSC-14. #26-3064 19^{95}

7 Card Stud. Compete with three computer poker players. They can adjust to your playing style and make it more difficult to win. Was $24.95 in RSC-14. #26-3000 19^{95}



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RECEIVED & CERTIFIED

The following products recently have been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

Disto Floppy Disk Controller, a disk controller for CoCo or CoCo 2 with gold contacts on all connectors, shielded metal box for low RF noise, four 28-pin sockets, internal mini-expansion bus interface and 16 MHz high speed master clock. CRC Computers, 1720 Charette, Duvernay Laval, Quebec, Canada H7E 4L9, $99.95

Graphicom Part II, a 64K menu-driven graphics utility requiring at least one disk drive and capable of supporting four drives. Does not require *Graphicom* to run and includes these functions: Load and Save both *Graphicom* format screens and standard (binary), keyboard or joystick input, color or black-and-white Hi-Res operation, OOPS command to recover mistakes and four screen display modes. Computize, Inc., P.O. Box 207, Langhorne, PA 19047, disk $24.95 plus $3 S/H

Hardcopy, a 64K screen print/graphics dump utility requiring at least one disk drive but capable of supporting four with keyboard or joystick input. Compatible with *Graphicom* and *Graphicom Part II, Hardcopy* loads standard 6K images and *CoCo Max* pictures. Capable of supporting Hi-Res in all four *Graphicom* display modes; there is also black-and-white or gray scale printing. Users should specify printer when ordering. Computize, Inc., P.O. Box 207, Langhorne, PA 19047, disk $29.95 plus $3 S/H

War of the Worlds, a 64K joystick-driven Adventure in three chapters. Suitable for group play, each chapter contains more than 200 situations. Possible are save game option and master control option which resumes play at the point where you left off. Triad Pictures Corp., P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, cassette $18.95 per chapter or $39.95 for complete three chapter edition plus $3 S/H

Soccer Statistics Package, a 32K sports utility requiring a disk drive. Possible are mid-season entry, updates and additions, correct and review all stats in file, correction on all input screens; raw dump to the printer for the player, goalie and opposing team's files; summary of the player, goalie and opposing team's stats. Also, summary of 16 individual player and 10 goalie stats; tracking of 14 goalie stats; and 19 opposing team stats. Sugar Software, 1710 North 50th Avenue, Hollywood, FL 33021, disk $29.95

Utility Routines, a book written for BASIC and ML programmers including routines such as Command Keys, Super Scroller, Full Length Errors, Auto Line Increment, Pause Control, and Cursor Styles. Compatible with 16/32/64K disk or cassette, CoCo or CoCo 2. Microcom Software, P.O. Box 214, Fairport, NY 14450, book $19.95; book with cassette or disk $36.95; cassette or disk only $24.95 plus $2 S/H

Enhanced Disk Operating System Version 2.6, an alternate operating system for the CoCo designed to replace Disk Extended Color BASIC 1.0 while remaining 98 percent compatible. *EDOS2.6* requires a disk system with a drive capable of 6 ms and 40 tracks and is available only on an EPROM which is enclosed with the pack. Micro Computer Services, P.O. Box 1001, 101 Bush Street, Angus, Ontario, Canada L0M 1B0, $100

Latin Translator, a 32K ECB utility package requiring a disk drive for the teaching or learning of Latin. Based on the first semester course followed in the book *First Year Latin* by Charles Jenney, Jr., Roger V. Scudder and Eric C. Baade, it requires some fundamental knowledge of Latin but examples are given within the manual and the program itself. Joe Pottinger, 13 Pauline Ln., Rolla, MO 65401, disk $14.95 plus $2 S/H

Q.D.S. A/B-4, a disk driven syst
consisting of Hard Drive Speciali
floppy drive controller and two doub
sided, double-density Remex RFD 4
disk drives. The controller has go
plated edge card connectors, absence
potentiometers and dual selecta
ROM sockets. The dual Remex R
480 drives run up to 5 ms track to tr
speed and have a special circuit Quat
Data Systems installed on the dr
board to intercept the drive select sig
from the controller and change
signal; the double-sided drives act l
four separate single-sided drives allo
ing users without a DOS that suppo
double-sided drives to use both si
of the drive. Quattro Data Syster
P.O. Box 180071, Austin, TX 787
0071, controller $120, dual drives $3

RS23210, a utility program to incre
the flexibility of the RS-232 port w
any custom peripheral or homema
project such as robotics, ROM burn
and any RS-232 peripheral not set
specifically for the CoCo. Racine, 52
S. Birmingham, Tacoma, WA 984
cassette $30

DynaCalc, requires OS-9 Operati
System and handles all types of da
numbers, labels and equations. Possi
are the creation of worksheets of 2
columns and 256 rows; printer outp
24 built-in mathematical functio
performance of all regular math op
ations to 16-digit accuracy; and readi
and writing of OS-9 data files. Ra
Shack stores nationwide, disk $99.95

Super LOGO, an expanded version
Color LOGO with the added features
list processing capability, deci
arithmetic, flexibility in the use of
immediate mode, and improved editi
and disk handling features. Compa
bility with Color LOGO has be
maintained and almost all procedu
written in Color LOGO will run with
alteration in Super LOGO. Radio Sha
stores nationwide, disk $99

OS-9 Solution, an interface softwa
system requiring OS-9 Version 01.01.
designed to make OS-9 menu-driven
replacing 19 OS-9 commands wi
single keystrokes. By using a directo
window with the up- and down-arr

eys for access and command execution, e program allows multiple copying, lling and info printouts for whole or artial directories. All XMODE pa- meters can be set at the touch of a ngle key and the necessity to type long athnames has been eliminated. Spec- um Projects Inc., P.O. Box 21272, 93- 5 86th Drive, Woodhaven, NY 11421, sk $39.95, plus $3 S/H

oCo Solver, a 32K utility requiring disk drive or 16K for cassette users use as an equation generator, a mini ta file manager, programming tutor d advanced programmable calculator. ptions include utilities to kill files on data disk, erase, copy and a monitor PEEK at memory. Compatible with DOS as well as Disk BASIC. JTJ nterprises, P.O. Box 110841, Nashville, N 37211, disk for 32K or cassette for K $79.95

pine Align Cushion, designed to be sed with standard secretarial chairs or at seats without back supports, this ngled, well-padded cushion is meant reduce "desk distress" of the lower ack. Spine Align, 345 So. McDowell lvd. #209, Petaluma, CA 94952, 9.95 plus $2.50 S/H

aseball Statistics Package, a 32K orts utility requiring a disk drive. ossible are mid-season entry, update d additions; correct and review all ats in file; correction on all input reens; and raw dump of data to the inter for the player, pitcher and posing team's files. Also, summary the player, pitcher and opposing am's stats; tracking of 21 individual ayer stats with 18 cumulative stats per ayer; tracking of 15 individual pitcher ats with 11 cumulative totals per tcher; compilation of total team mmary of 16 separate stats; and mpilation of total pitching summary 11 stats. Sugar Software, 1710 North th Avenue, Hollywood, FL 33021, sk $29.95

sketball Statistics Package, a 32K orts utility requiring a disk drive. ssible are mid-season entry, update d additions; correct and review all ats in file; correction of input screens; w dump of data to the printer, for e player and opposing team's files; mmary of the player, opposing team d 17 individual player team stats. so, tracking of 22 individual player ats with 18 cumulative stats per player; and compilation of opposing team summary of 19 separate stats. Sugar Software, 1710 North 50th Avenue, Hollywood, FL 33021, disk $29.95

Football Statistics Package, a 32K sports utility requiring a disk drive. Possible are mid-season entry, updates and additions; correct and review all stats in file; correction on all input screens; raw dump of data to the printer for the player and opposing team's files; summary of the player and opposing team's stats; and tracking of 90 individual player stats. Also, summary of 63 individual cumulative stats per player; summary of 17 cumulative team and 28 cumulative opposing team stats; team summaries of 87 stats; comparitive summary printouts of 63 stats for your team; and 62 stats for the opposing team. Sugar Software, 1710 North 50th Avenue, Hollywood, FL 33021, disk $29.95

Thunder RAM, a 256K memory upgrade board for the Color Computer requiring a disk system. Features include the emulation of a 40-track RAM Disk, speed up to 30 times faster than an ordinary floppy disk drive, a full 60K print spooler and storage of up to 30 Hi-Res screens in memory at one time. Users can create BASIC programs up to 128K long. Spectrum Projects, Inc., P.O. Box 21272, 93-15 86th Street, Woodhaven, NY 11421, $119.95 plus $3 S/H

Cosmic Paint, a 32K graphics system requiring at least one disk drive (two are recommended) and an analog joystick (Radio Shack), a mouse or a touch pad. Commands reside in an icon grid featuring scrolling, lines, rectangles, boxes (3-D), detail mode, circles or ellipses, painting, sketching, a disk menu, magnification, a wrench (for fixing mistakes), erase, mask patterns, dump to printer, text and select (to modify portions of the screen). Cosmic Software, 515 Beverly West, Sherwood, AR 72116, disk $20

Teacher Pak, a 16K collection of four programs for teachers designed by teachers. *Dister*, a statistical analysis utility for lists of numbers such as, but not limited to, grades. It works out averages, sample, and population standard deviations and variances. Possible are both printed and on-screen distributions. *Grader* allows users to choose straight percentages or weighted grading. *Alpher* produces printed or on-screen alphabetized lists of names or words. These lists may be saved and used with *Grader* and *Seater*. *Seater* produces printed seating charts for classrooms of almost any size.

Teacher Pak Plus, requires 32K and contains all of the above with *CoCo Testum* for an 80-column printer with underline function to create and print tests. Possible are the creation of multiple choice, fill in the blank, short answer, true/false and matching tests. Tothian Software, P.O. Box 663, Rimersburg, PA 16248, *Teacher Pak* cassette $34.95, *Teacher Pak Plus* cassette $47.95

Color Computer Machine Monitor—CCMM, a full-featured debug machine monitor that interfaces with the ROM-resident operating system(s) and device configuration(s) of CoCo and CoCo 2. The command facilities include: LIST/EDIT of registers, memory and program; EXECUTE of program (sub)routines under monitor supervision; TRACE of RWM Resident program instructions; BREAK-Point on control sequencing; ACCESS-point on data addressing; self-relocatable, Position Independent Code (P.I.C.); CoCo dependent [2K] and stand-alone [4K] Versions. Published by Real Computers and Intelligence of Santa Clara, Calif., and distributed by The Zellerbach Group, Unit 216, 1335 Pacific Avenue, San Francisco, CA 94109, disk CCMM 16/D program(s) $16.95, manual CCMM 20/S $9.95, tape CCMM 17/T program(s) $14.45, manual CCMM 20/S $9.95

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine *certifies* the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW's reviewers for evaluation.

— Monica Dorth

REVIEWING REVIEWS

Consumer Wish List

Editor:

I've found that as a consumer of software for the Color Computer I need to know the following: 1) Is the program position independent? (I will not buy one that is not.) 2) Is the program ROM independent? (Again, I will not buy one that is not, as I have different CoCo systems at work and at home.) 3) Does the program provide an easy return to BASIC? (or OS-9, as the case may be.) Some programs, especially games, take over the computer and require it to be shut off in order to return to BASIC. I then have to reload all of my defaults and external hardware registers. 4) I need to know whether or not a backup can be made. 5) If the program is a graphics program, does it store the results in a manner consistent with loading to a BASIC graphics screen? (Or is it like *Art Gallery*, where the tape cannot be used by any other program?) 6) Will it work with all larger RAM sizes? 7) If the product is a program pack with a port in it, what is the port address or address range? 8) Does the program require a special interface, the Multi-Pak or a specific printer? 9) Does the program pack require 12 volts? (One of my systems has 12 volts, the other does not. Some of my ports will not work on the CoCo 2.) 10) Does a driver for a device conflict with certain other software?

I feel that if the above information could be included in a review a consumer can make an informed choice.

Larry Robinson
Bloomington, IN

CENTIPEDE ABC's & 123's

Editor:

We would like to thank RAINBOW and Stephanie Snyder for the thoughtful and thorough review of *Centipede ABC's & 123's* in the June 1985 issue (Page 205).

Somehow the price change we reported to you didn't make it into the review. For the record, *Centipede ABC's & 123's* are now sold on one cassette for $18, not the $25 listed at the end of the review.

Ms. Snyder hit upon something in her review which no one here at Triad, nor any of the 400-odd preschools using the program saw: the need for a shorter game option to accommodate the shorter attention span of 2-year-olds. Future versions of the program will incorporate such a feature. Thanks!

Stan Osterbauer
Triad Pictures

ADVENTURUS SUPREMUS 4.6B

Editor:

I would like to thank RAINBOW for the positive review of *Adventurus Supremus 4.6B* in the June 1985 issue [Page 221]. However, there are a couple things that I would like to comment on.

First, I feel the mention of R-rated actions is out of place. The one action that causes death is meant as punishment for vulgarity, and the other action uses proper English. I feel that these actions are at very most PG-rated and are less offensive than many things most children have seen in PG-rated movies. I even talked to the reviewer about this, and he agreed I am probably right in this.

Second, the use of the OK prompt is meant to be humorous by being slightly smug. Also, since all the verbs are listed, the only problem should be in finding a working verb/noun combination, so such a simple prompt is justified.

All things considered, I found the review to be thoughtful and positive, although the remarks about R-rated actions did disturb me a little. Also, keep up the good work, because everyone involved with the Color Computer benefits from the thought competent reviews you publish.

Michael Marcell
Bacchus Computer Softw

MULTIPLE CHOICE TEST

Editor:

First, I wish to thank you for y consideration and review of our *Multi Choice Test* program [August 1985, P 202]. I have always appreciated your f and honest reviews of other products, a I hope we at D&D Software can make grade.

Multiple Choice Test has been develop for a specific need, and as an alternat for those who can use it to meet their nee We are very explicit in our advertising to what our programs will do and we b our programs 100 percent. At $29.95, feel we have given teachers a vial alternative.

In response to the review by Mr. McGar it strongly stressed what the program wo not do and has no balance of its capabiliti A review should at least mention the featu of a program so the customer can make his or her own mind as to its benefits a use by comparing the assets and liabilit of the program.

As to the "bug" found in saving a te why would anyone go to the trouble making up a test and not giving it a filena before saving it, especially when there i specific prompt to do so? Nevertheless, will write in an error trap to cover t situation should it occur. If there are b in any of our software, individual hardw problems, operator problems, or speci software needs, our customers can ass you that we will be there to help.

Dale Lit
D&D Softw

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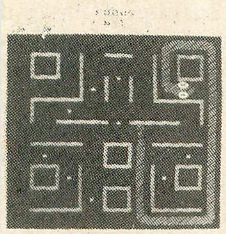
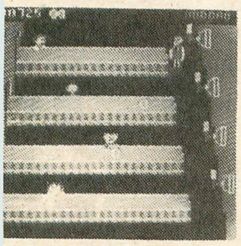
TOP QUALITY SOFTWARE AT AFFORDABLE PRICES! WRITTEN BY WELL-KNOWN AUTHORS IN 6809 MACHINE LANGUAGE ESPECIALLY FOR *NOVASOFT*™



BUZZWORM

This one will drive you nuts. Guide the snake around the screen eating the snakebait for points; but don't bite yourself! Lots of fun awaits you with this one.

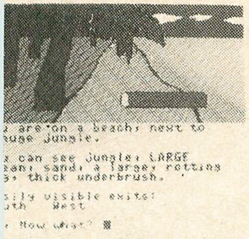
REQUIRES 32K & JOYSTICK
TAPE $15.95
DISK $18.95



BREWMASTER

Move along the end of the bars serving beer to your thirsty customers. Watch for falling glasses and rowdy customers. Loads of fun.

REQUIRES 32K & JOYSTICK
TAPE $14.95
DISK $17.95



```
 are on a beach; next to
uge Jungle.

 can see Jungle; LARGE
ean; sand; a large; rotting
g; thick underbrush.

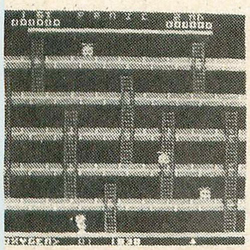
sily visible exits:
uth   West

 Now what? ▓
```

BLACKBEARD'S ISLAND

A brand new high res graphic adventure. This one will blow your socks off! Wander around Blackbeard's Island being ever mindful of the hazards while your lust builds for Blackbeard's buried treasure. T'aint easy, matey!

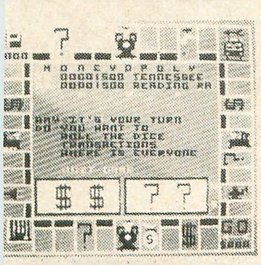
REQUIRES 32K   DISK ONLY
DISK $19.95



PANIC

Climb the ladders and fight the "meanies". Dig holes and bury them. Hours of fun await you in this outstanding graphic arcade game. Enjoyment for all ages.

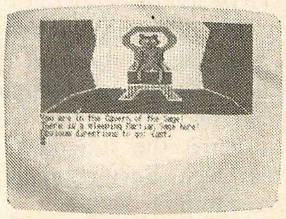
REQUIRES 32K & JOYSTICK
TAPE $14.95
DISK $17.95



MONEYOPOLY

Now! Play this popular board game on your computer. Probably the most realistic computer board game simulation ever. Contains all the features of the original. Buy, rent or sell properties and become a wealthy land baron with this program.

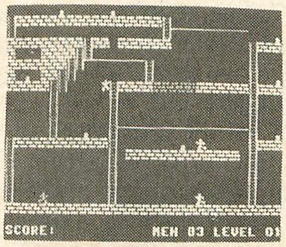
REQUIRES 32K & JOYSTICK
TAPE $19.95
DISK $22.95



THE MARTIAN CRYPT

All new graphic adventure — Man discovers that life once existed on Mars. Can you find the hidden Martian Crypt? with sound effects to over 30 screens of animated high res graphics.

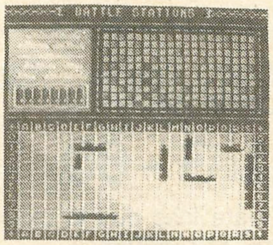
REQUIRES 32K MACHINE
TAPE $18.95
DISK $21.95



GOLD RUNNER

Travel the maza, in your never ending search for **GOLD.** But be careful! There are hidden trap doors, burly guards, tricky ladders & slippery ropes. Sounds easy you say? Clear the 1st screen and 24 more await you!

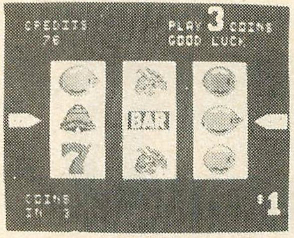
REQUIRES 64K MACHINE
JOYSTICK OR KEYBOARD
TAPE $12.95
DISK $15.95



BATTLE STATIONS

BATTLE STATIONS is a remake of a popular board game. Without a doubt the most outstanding sound and graphics you have ever heard or seen. **BATTLE STATIONS** is a one player interactive simulation of skill, strategy and luck. The player pits his tactical skills against the cold, cunning logic of the computer.

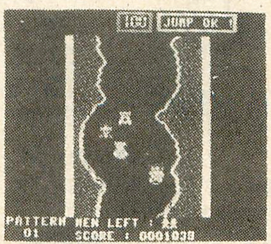
REQUIRES 32K DISK
TAPE $21.95
DISK $24.95



VEGAS GAME PAK

Have you ever wanted to bring Las Vegas home with you? Now you can! Six different games in this package: Blackjack, Keno, Poker, plus three other slot machine lookalikes. The only thing missing is the voice of Wayne Newton!

REQUIRES 16K EXT. BASIC
TAPE $24.95   6 games
DISK $27.95



COLOR CAR

You asked for it and now here it is! Fast-moving Grand Prix style racing. With your computer sit at the wheel of your racer through the difficult racecourse. "Bump & Jump" other cars, but be careful because they'll return the favor!

REQUIRES 64K & JOYSTICK
TAPE $19.95
DISK $22.95

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Practical Programming In Pascal
Makes Learning Pascal Easy

PASCAL is much more than a programming language. It was conceived by Niklaus Wirth as an academic tool to teach structured programming techniques. As such, most texts on the subject are written with the computer science major in mind, and are extremely academic and technical. For a novice programmer, it can be a strenuous if not insurmountable task to try to learn the language for practical purposes from such a text. Kent Porter's *Practical Programming In Pascal* bridges the gap.

Inside the flashy red, soft cover of this book (which will make it easy to find in the pile of documentation that always accompanies computer ownership) is a very well organized text. Also, due to Mr. Porter's smooth writing style and thorough knowledge of PASCAL, all 266 pages are incredibly easy to read and understand.

In the first four chapters you will be introduced to the history of PASCAL and the benefits of structured programming, then be taken from a description of the bare basics through the step-by-step development of a program using PASCAL's excellent looping and decision making abilities.

The development of the program from statement purpose to final product is, of course, accompanied a technical discussion of the parts of the program as t are constructed. As the book progresses, this proces repeated, developing more and more complex progr while readers learn more and more features of this powe programming language. By the time you finish it, you have a practical knowledge of PASCAL and have lear structured programming techniques which you can ap regardless of the language you are using.

This brings me to BASIC09. This book was written Mr. Porter as "An Introduction to Computer Programmi and has much general programming information dem strated in PASCAL. In that BASIC09 is an enhanced BA with added PASCAL-like features, they are very similar you are having some difficulty understanding some of features of BASIC09 like parameter passing, defining d types and complex data structures, this book will h It is a PASCAL study guide, however, and it should studied along with the use of a PASCAL compiler.

In summary, if you are just beginning, this book get you started in the right direction. Get yourself of the available PASCAL compilers and use *Pract Programming In Pascal* as your study guide. You'll writing PASCAL programs in no time.

If you already program in PASCAL at an intermedi level, the book will be useful for review purposes. Si it is structured as a study guide, it is not particularly sui for use as a reference manual, but it is fully indexed.

(New American Library, 1633 Broadway, New York, NY 10019, $14.95)

— James F. Tay

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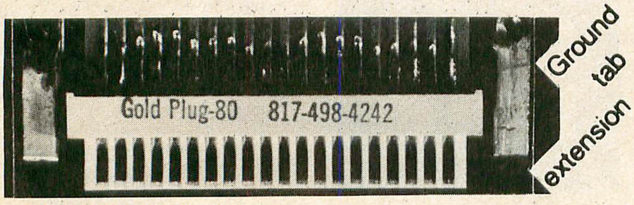

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One-Liner Contest Winner . . .

Windows demonstrates some of the CoCo's "windowing" capabilities. Enter PMODE4:PCLS before RUNning.

The listing:

```
1 PMODE4:SCREEN1,1:PMODE0:X=RND(
255):Y=RND(191):R=RND(50):C=RND(
4)-1:CIRCLE(X,Y),R:POKE178,C:PAI
NT(X,Y),,1:PMODE0,2:X1=RND(255):
Y1=RND(191):LINE(X,Y)-(X1,Y1),PS
ET:PMODE0,3:POKE178,C:LINE(X,Y)-
(X1,Y1),PSET,BF:PMODE0,4:LINE(X,
Y)-(X1,Y1),PSET,B:GOTO1
```

Mark Werdin
St. Ignatius, MT

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

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Data Bank Organizes Data With Or Without OS-9

My previous experience with serious microcomputer databases was the Model II's *PROFILE II* and CoCo's *Pro-Color-File*, so I knew this package wasn't a game I'd be playing with the kids.

Data Bank has many of the same features I was already used to: user definable data to be stored, the input screen(s) and report layouts to the screen or printer. It does include all basic math functions so the computer will automatically make calculations for you.

Validation of input lets you be sure you're only putting numbers or letters (even numbers or letters between specified limits) in fields you define as numeric, alphanumeric, date or reserved for computer generated math answers. This eliminates lots of unhappy hours at report time.

You will receive an unprotected disk and a 29-page manual. A tutorial database is included to help get your feet wet.

Data Bank operates in the OS-9 environment with at least one drive. It does take advantage of extra drives. You do need 64K, but you do *not* need the OS-9 system. The package allows you to load and run from BASIC.

I ran the program from my version 1.0 of Radio Shack Disk BASIC without any problem and went directly into the tutorial. The wide screen is very impressive but sometimes a little hard to read from a TV screen.

Everything was explained clearly between the manu and screen prompts until I got to the part where you c change your display format, and I found I didn't ha lowercase. Also, repeatedly I found myself outside t tutorial database and having to completely exit the progra and start over — that's really frustrating.

Anyone not familiar and comfortable with the OS environment will be completely baffled by some of problems they'll run into such as suddenly finding th tutorial is no longer in the active directory, strange er messages and having no lowercase input. Shell comman and error messages are explained somewhat in the manu but BASIC users are very restricted without a real OS system.

Data Bank lets you delete records (and restore the if you make a mistake), compress data files to elimin dead space, selectively transfer (archive) records, ev restructure your records if you later find a need for chan — this is impossible or tricky in other programs.

I was impressed with the ease with which new files c be set up. You'll be prompted on the screen for many thin I've had to search for in other programs.

Reports are easily formatted, and you can specify tot and break points. I didn't follow through myself, but i easy to imagine a checkbook application with subtot for various expense items so you would have your figu all organized and in one place for the IRS next April 15

I was disappointed that *Data Bank* doesn't seem to ha an option for conditional sort. For instance, sort and pr all records whose ZIP code is higher than 69999. Al no provision was made for easy label printing.

This is a pretty powerful database manager which mea you'll need to spend some time learning how to mast its abilities so they'll work for you. No one should exp to go into any program of this caliber without expecti to invest some serious time.

OS-9 isn't really needed, but BASIC users will sa themselves a lot of frustration giving this one a wide bert Otherwise, I can recommend this without qualificatio to anyone who wants to get all that disorganized data sort out and stored in order.

(Computerware, P.O. Box 668, Encinitas, CA 92024, requires 64K, disk $79.95 plus $2 S/H)

— Bob Doom

One-Liner Contest Winner . . .

This one-liner is called *Rowboat*. If the water comes up red instead of blue, press the Reset button and run the program again; repeat if needed to make the water blue.

```
0 PMODE4,1:PCLS:SCREEN1,1:FORA=0
TO255STEP20:CIRCLE(A+10,164),10,
,.7,0,.5:NEXT:DRAW"BM175,168M192
,144L119M90,169BM132,144NG25E20F
3G42BM133,144C0R4":POKE178,2:PAI
NT(0,191),,5:PLAY"L4CCL8.CL16DL4
EL8.EL16DL8.EL16FL2GO4L8CCO3GGEE
CCL8.GL16FL8.EL16DL2C":RUN
```

Garry Sittler
Jacksonville, IL

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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VISA

:yrus World Class Chess Is \ New Dimension In Chess

)o you enjoy playing chess? If not, would you like to ·n? Or would you just like to sit back and watch the ıputer play a game by itself?

f you answered "yes" to any of the above questions, n *Cyrus World Class Chess* is what you're looking for. *·us* requires at least 16K RAM (a joystick is optional). er inserting the cartridge, the title screen appears for ıort moment, then the chessboard appears with the chess :ces automatically placed in position — white at the tom of the screen and black at the top. You are now dy to play.

f you have never played chess before, you will find the ıual most helpful. It gives an in-depth explanation of rules of chess and the types of moves each piece makes. :n if you're an expert at chess, there are some options t *Cyrus* has to offer in order to make your game more :resting and challenging.

Vhen the chessboard appears, you will see a small green are flashing on and off inside the square at the bottom-corner of the board. This square, known as the marker, icates to the computer the piece you want to move. : four arrow keys are used to move the marker around board.

'o move a chess piece, first bring the marker onto the are occupied by the piece you want to move. Secondly, ss ENTER and the piece will start to flash, then use the ɔw keys to move the piece to its new square and press 'ER again. The joystick may be used for the same pose.

f you attempt to make an illegal move, an error signal nds, and you must move again. Also, if you have taken trol of a piece but then decide not to move it, return o its original square and press ENTER. The piece is ırned and the marker may be moved to another piece. en you have completed your move, *Cyrus* computes :eply and then makes its move.

:*yrus* always lets you move first and play white. If you ıt to play black, press 'M'; *Cyrus* will then move first. s possible to have black at the bottom of the screen pressing 'I' to invert the board.

)ther than the chessboard itself, there are several other ɔlays. By pressing the space bar, the message display appear. The message display shows a record of the ves made so far in the game. It records the moves with the use of a letter-number system. Each column is given a letter name (A through H), and each row a number (1 through 8). The level at which you are playing is also shown on this display. The levels (one through nine) represent the amount of "thinking" time that *Cyrus* is allowed before each move. *Cyrus* plays better if it has more thinking time per move. The time spans range from two seconds to three and a half minutes.

There are three additional levels: adaptable, infinite and problem. When playing on the adaptable level, *Cyrus* takes roughly the same amount of time as you. When playing on the infinite level, *Cyrus* will normally compute until you tell it to move by pressing 'M.' On the problem level, *Cyrus* searches for a way to force checkmate in five moves or less.

The other displays show numerous commands and options you may use during the game. For example, you can watch the computer play by itself by pressing 'D.' It is also possible to take back a move by pressing 'B.' If you cannot decide which move to make, press 'H' and the computer will give you a hint.

Cyrus is such a versatile game and has so many options that it would take days to explain them all. Although I am not a master at chess, I enjoy playing it every so often, and *Cyrus* is by far the best video chess game I have ever seen.

(Radio Shack stores nationwide, 16K Program Pak, $39.95)

— David So

lint . . .

Machine Language Offset Loading

If you want to load an ML file at a location higher ıan the addresses in the file, type the command LOADM (or LOADM for disk) "filename", (new ddress-old address). If you want to load a file at lower location, type the command CLOADM (or OADM) "filename", (new address-old ddress)+65536.

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Metric Mind Performs Well At Teaching Conversions

Have you heard the recent radio commercials about the new "Thirstbuster" bottles of cola? It seems that the world of metrics is upon us again. This time in the new three-liter size. Gee, how many eight ounce servings can I get out of this one? How many calories per bottle would that be? I had better get the old *Metric Mind* out and start practicing again. I am referring to *Metric Mind* by Creative Technical Consultants Software. *Metric Mind* is a drill and practice program to assist students in learning conversion between metric and English units of measurement.

Metric Mind is written for a CoCo or CoCo 2 with Extended Color BASIC and at least 16K of RAM, and it comes on cassette. With a 16K machine, you must first perform a `PCLEAR 1` before loading the program. If you also have a disk drive attached, you may have to unplug the drive from the computer before loading the program so as not to receive an OM Error.

After loading the program and typing `RUN`, a menu displaying five choices appears. They are as follows:

1) Conversion table
2) Prefix table
3) English to metric problems
4) Metric to English problems
5) Estimating in metrics.

Menu choices one and two simply display conversion tab
and metric prefixes.

When you select either of these choices you are promp
for a skill level of from one to five with five being
most difficult. A skill level of five will display all of
conversion tables and prefixes. There are a total of
different conversion formulas for converting things l
inches to centimeters or miles to kilometers. There are e
a few exotic formulas like 1 Joule = .24 calories. Just thi
at only two calories per bottle you'll now be consum
8 Joules. Feeling a bit heavy?

Selecting menu option three or four brings us to
nitty gritty of *Metric Mind*. Here you'll get a chance
strut your stuff. The program now prompts you for y
name and a skill level and proceeds with a series of
conversion problems. You are presented with wor
problems such as "If Puff The Dragon is 5 miles long fr
head to tail, how many kilometers long is he?" You
then given two chances to provide the correct answer.

Since the program is to teach metrics, not math, y
answer may be within plus or minus two percent of be
correct and it will be accepted. After 10 such proble
you are asked if you would like to try again or ret
to the main menu to select another option or skill level.

The last menu option, "Estimating in metrics," sim
presents you with some common objects like a stop s
and requests that you estimate its size in some metric u
All in all, *Metric Mind* performs well and does wha
is advertised to do: drill and practice.

**(Creative Technical Consultants, 16-8 Sangre de Cristo,
P.O. Box 652, Cedar Crest, NM 87008, 16K cassette $17.95)**

— Larry A. Birkenf

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Color Micro Journal, February 1985
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Hot CoCo,May 1985

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Tape . . . $21.95 (16K required) See July '83 review.

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One-Liner Contest Winner . . .

Gemslash produces slashed zeros on Star Micronics
dot-matrix printers (such as the Gemini-10X and 15X
which don't normally have this character. It works
by downloading a bit image of the character into
the printer, which will then use this new character
in place of its usual zero. To return to the normal
zero (for text applications) switch the printer off and
back on.

The listing:

```
1 CLS:PRINT"GEMINI SLASHED-ZERO
:PRINT"TURN PRINTER ON: PRESS e
ter":EXEC44539:A$="":FORX=1TO20
READY:A$=A$+CHR$(Y):NEXTX:PRINT
-2,A$:DATA27,42,0,27,42,1,48,0,
2,34,65,16,73,4,65,34,29,27,36,
:END
```

John R. Cur
Louisville, K

(For this winning one-liner contest entry, the author has been sent copie
of both *The Rainbow Book Of Simulations* and its companion *Rainbo*
Simulations Tape.)

Battle of the Bulge: A Tactical Game Of World War II

ne fog has kept Allied aircraft tied down in England veeks. The advance on the Rhineland and into Germany alled in the forests of Belgium. American and British ps will have to spend Christmas in the mud and snow, ed down by scattered German resistance.

iddenly SS Panzers attack! Where have all those Tiger s come from? Who is guarding the Third Army fuel ps? Where is Patton?

n December 16, 1944, the Battle of the Bulge starts the Belgian town of Bastogne. Hitler has massed 27 sions, including nine armored, by pulling troops and s from the eastern front. German forces drive westward ugh the Ardennes forest. The Allies must hold out l the weather clears and air strikes can resume. Hitler's great counter offensive of the war will decide the fate urope.

attle of the Bulge is a strategic war game for one or players. This game recreates the last German attempt reak through the Allied advance across Europe that ed with the invasion of Normandy in June 1944. You e your troops and tanks, call in artillery support, engage mbat and wait for the weather to clear.

ne object of the game is for the Axis forces to capture town of Liege, on the Meuse River, or break through Allied lines and cross the river. The Allies must hold until December 31.

ne game begins with a display of the battlefield. A resolution map shows rivers, forests, roads and towns. ngle screen of text introduces the game and asks whether want to play against the computer. If you so choose, computer will take the Axis side and make the first e.

layers alternate turns moving their entire forces, with focusing on a local battle screen. A map displays a ll region of action and gives the moving unit's name, bat strength and movement range. The map area is posed of text and graphics characters that represent ous terrain features and unit types (knowing the rence between armored and infantry divisions is very ortant). Towns are represented by a single letter; water solid blue block. Allied troops are beige, Axis troops nagenta, etc.

ou move your units with the arrow keys. The troop ement is accompanied by sound and costs from one t on roads to four points in mountain terrain. Moving water stops the unit for that turn.

rtillery support can be called in by any infantry unit has an average level of strength remaining. You move X' over the target with the arrow keys. The maximum e is five grid positions. Firing at random in a three-hree grid about the target, each barrage produces a stic sound. A direct hit reduces the enemy's strength ne. Even bridges can be destroyed by artillery fire. sometimes offers a temporary tactical advantage.

Other commands at your call include intelligence reports on local forces, an expanded map of the region, complete strength of your forces, and requests for artillery support, or air strikes if available.

Help is provided for new players. The '@' key calls up a sequence of four screens that review the unit designations and give brief descriptions of commands. A separate map sheet is provided with the instruction sheet to help you visualize the whole field of play.

Combat begins by moving onto an opposing unit's square. The outcome depends on the two units' relative strength, type of terrain they occupy (or moved from) and a random factor. Losing units either retreat or are eliminated when their strength is reduced to zero.

The game blends the capabilities of the CoCo with the action and strategy of good war gaming. The elements of movement and fire power are well-balanced and the final objective is sometimes difficult to obtain.

The computer play of the Axis divisions doesn't effectively use artillery fire. Only a few random shellings are made during the first round of play. After that, the Axis forces conduct a respectable Blitzkrieg, moving relentlessly toward their goal. It can be frustrating to chase a Panzer battalion that has broken through the lines.

A typical game requires one and a half to two and a half hours. The time passes quickly, but there is no provision for saving a partially completed game.

I don't usually like "involved" war games, but *Battle of the Bulge* is an exception. The action is intense, the play is challenging and the outcome is never certain. The historical battle was won when the skies finally cleared and air strikes wiped out the last German Panzer threat. The computer game may rewrite history.

(Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, cassette $25.95, disk $28.95)

— Stuart Hawkinson

One-Liner Contest Winner . . .

Alphabet is a good program to teach children how to use the keyboard. It puts a letter on the screen at random and waits until that key is pressed.

The listing:

```
0 CLS:X=RND(26)+64:PRINT@271,CHR
$(X):FORT=1TO999999:A$=INKEY$:IF
 A$=CHR$(X) THEN SOUND 200,3:GOT
O 0:ELSE IF A$<>""THEN SOUND 50,
3:NEXT T:ELSE IF A$="" THEN NEXT
 T
```

Will Cotter
Redway, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

CINC PAC — Battle of Midway For Victory At Sea

By H. Larry Elman

A few months ago I single-handedly sank the entire Royal Navy in the English Channel; shortly after that, I found a way to mishandle even U.S. Marines into frequent surrender. So the RAINBOW editor, reacting the way any normal government ruler would, gave me an extra star or two and sent me off to command at Midway. Of course, one of the first ridiculous things I succeeded in doing was landing an entire Squadron of B-17 "Flying Fortresses" on the deck of the USS Yorktown. (This is comparable to driving a Boeing 747 airliner through your local car wash.)

Midway was one of the more crucial battles of this century and has become the focus of tremendous study by tacticians, strategists and war-gamers. There are a number of computer games available based on this battle; one of the best is Ark Royal's *CINC PAC — Battle of Midway*. (For the civilians among us, CINC PAC stands for Commander-in-Chief, Pacific Fleet. It is pronounced as if spelled sink-pack.)

In this game, the computer commands the Imperial Japanese Navy, while you command three aircraft carriers, a few squadrons of aircraft and three shore bases (two of which are almost totally useless). Your biggest advantage is the fact (as in the actual battle) that the Navy can read the Japanese code, enabling you to set an ambush.

Believe me, if you fight this battle without using that asset, your Color Computer will cream you! I know; it has beaten me more times than I will publicly admit.

If you have not tried war games (or "Battle Simulations" as some of their authors prefer to call them), then you have probably missed one of home computing's more challenging intellectual pursuits. You need not be either a militarist or a history nut to enjoy these descendants of chess.

War games can be broken into a number of subcategories, of which two are worth a short digression. Some war games are based on a particular historic event; *CINC PAC — Battle of Midway* is of this type, while chess is not. All
war games involve some sort of map for a board. I
computer war games use a low resolution, semi-gra
screen. Again, the comparison with chess is
appropriate.

A small number, *CINC PAC — Battle of Midway* an
them, utilize the highest resolution available on the mo
to provide a map board which looks like it came
a geography text. Of course, the selection of that ty
display implies dedication of much larger computer sto
just for the map.

Most semi-graphics war games can be programme
BASIC; *CINC PAC — Battle of Midway* uses BASI
input/output and logic, but has machine language co
over the displays. Another difference between semi-gra
and high resolution games is that the rules for naviga
and movement can be more generalized in high resolu
The price paid for this is the user no longer simply m
pieces with arrow keys, but must think through the an
directions for his movement and/or his fire.

I have seen semi-graphics simulate the tactics
particular time quite well, but I was unprepared for
well Steve Berry was able to model the subtleties of n
and air warfare at Midway and "shoe horn" it into
Color Computer's 32K. In this game, the user can
as if he is there — the displays are that well done,
even the pauses between moves have the suspense of "b
there."

As with most such games, I found the instructions
brief. There is no way to enter your initial game later
a week before the battle; the instructions suggest you
that time to practice fleet maneuvers. I did, but bec
a bit miffed because by the time I finished the pra
and had gotten acceptably proficient I had destroyed al
a third of my fleet in operational accidents! The only t
to do was start over at the NEW GAME point an
watching the idiot box while pressing SKIP MOVE
I had passed the wasted week. This process left my f
intact. After that, of course, I simply saved the new sta
situation and worked from it.

One of the reasons I lost so many assets during
up was a few bugs in the program. I phoned Ark R
and requested software support. During most of the i
calls they were unaware that I was reviewing the g
for RAINBOW, so I can state quite confidently that
software support to the general customer is excellent.

There seem to be two main problems. The lesser
is the lack of a logic trap to prevent overloading a plat
(carrier or land base); if more than nine squadrons of pl

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THinc

landed on any platform it is possible to hang the ;ram and watch your fleet sail off to never-never land. ause the normally prudent player is unlikely to put more ı five squadrons on any one platform, this bug is ;idered very minor.

owever, a somewhat related bug is the ability to lose :rol over a carrier by attempting to exit the Launch ıes sequence improperly. To correct that, simply replace : 1186 of the main program with:

```
S IF A$="S" THEN 1196 ELSE IF A$>"1" OR A$>"9"
  OR IF VAL (A$)>(UC+1) THEN 1185
```

his patch is simplicity itself on the disk version but ewhat inconvenient on the tape version. Ark Royal if you get a copy that is *not* marked with a red 'X' should contact them for replacement; copies with a 'X' will already have had the patch inserted. With the ɦ inserted, you can abort Launch Planes by typing ınd the keyboard is locked against the non-numeric ıt which is known to cause the bug.

nother minor difference likely to occur in the patched ion concerns Ship's Bells. In all versions, the program ; the Admiral (you) back from coffee breaks by sounding time with Ship's Bells. Later versions sound somewhat e like "Victory at Sea" than earlier ones; the do-it-rselfer can improve the early version by a higher pitched : in lines 1357 and 1359 and by a smaller time delay ,ine 1358. I mention this not as a bug, but as a small nple of the mood-setting touches which make this game timulating.

here is another anomaly in the program; whether to it a "bug" is a judgment call. Every U.S. unit on the en (possibly even some enemy units) is a tiny interrupt-en blinking light. Sometimes after combat, a downed will continue to blink; a ghost which can be battle :is. I considered it a radar sighting for my search units. screen shows about 3,000 miles of Pacific Ocean, but ıbat sightings are at distances more like 100 miles. urate navigation improves your score. On the other d, in one game I wasted three days' use of two B-17 ıdrons chasing these ghosts. Personally, I feel the ence of the ghosts provided the touch of uncertainty led in a combat game.

you want a game more challenging than ones which totally on the arrow keys or the joystick, consider *'C PAC — Battle of Midway*. It is good enough to itself a battle Simulation, and it is fun enough to call f a game.

Ark Royal Games, P.O. Box 14806, Jacksonville, FL 2238; requires 32K, tape $27.95, disk $30.95)

Book Review

CoCo Gains Power And Speed With *500 Pokes, Peeks 'N Execs*

This comprehensive book, *500 Pokes, Peeks 'N Execs* by Kishore M. Santwani, will provide you with hours of PEEKing, POKEing and EXECuting.

The soft cover book contains 68 pages, all chock-full of useful information for the CoCo user.

The use of the various commands listed will allow you to enhance the capability of your BASIC programs without having to resort to complicated machine language routines.

We are all familiar with the high-speed POKE and other often-used PEEKs and POKEs frequently found in the pages of RAINBOW. This book contains a wealth of others that will amaze and amuse you.

The book is well structured into various sections which deal with cassette, disk, printer, etc., and each command is followed by the expected result and an appropriate remark as to what it can be used to accomplish. Here in one easy-to-use source are all the various PEEKs and POKEs you will likely ever need. No more searching through scraps of paper and past issues of RAINBOW to find that "handy POKE I can't remember."

The book contains many useful commands and routines too numerous to list here, but suffice it to say that almost anything from *Auto-Start* to *Zaxxon* plays is covered. Other useful commands to provide key beeps and screen print are included as well as key disables, memory bank switching and recovering lost BASIC programs.

In summary, this is a unique book which contains information which took a great deal of research to collect. Many of the commands listed have been, until now, relatively guarded by those "in the know." It will help unravel the many POKE, PEEK and EXEC commands of the CoCo to help you gain the power and speed of assembly language through BASIC. It will help you reach greater heights in successful programming and professionalize your work. I believe you will find *500 Pokes, Peeks 'N Execs* worth the price.

(Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $16.95 plus $3 S/H)

— Jerry Semones

Iint . . .

Automatic Lowercase

To move automatically to lowercase, type POKE 82,0. To switch back to all caps, type POKE 282,1.

Hint . . .

Cold POKE

If for some reason you want to simulate a cold start up, type POKE 113,0 and ENTER, then press the Reset button. (The usual EXEC 40999 doesn't work properly if your computer is in the 64K mode.)

Practice Your Math Skills With *Mathfun*

Mathfun is an educational program designed to give the user practice in basic mathematical skills. This program randomly generates numbers, between two digits and five digits, which the player must either add, subtract, multiply or divide.

After loading *Mathfun*, which requires a Color Computer with Extended BASIC, the title screen appears. The player is then asked to enter his/her name, up to eleven letters in length. The main menu is displayed and shows the types of mathematical equations available. To make a selection, press '1' for addition, '2' for subtraction, '3' for multiplication, '4' for division, '5' for a mixture of problems, or '6' to terminate the game. If addition, subtraction, or a mixture is chosen, 10 problems will be given to the player to solve. If multiplication or division is chosen, then seven problems will be given. After making a selection from the main menu, a skill level must be selected by pressing '1,' '2' or '3.' If the player arrives at the skill level menu and decides that he would like to change his selection from the main menu, he may press 'C' to return to the main menu.

For each problem, the player types in his answer and presses the ENTER key. The program then tells the player whether the answer is correct or incorrect, and an appropriate tune is played based on the results. Sh a player wish to end a round before it is completed round can be aborted by entering a special code whe program asks for the answer. This code is O11O11O ('O' is the capital letter 'O,' not zero).

At the end of each round (a set of seven or 10 proble a summary of that round is displayed. The display incl the number of correct answers out of the numbe problems and the percentage of correct answers. summary takes into account the total number of prob the round is supposed to present (seven or 10) even i round is aborted. However, the final summary only t into account the attempted problems. After reviewin round summary, press ENTER to continue. At this the main menu will reappear.

The final summary is displayed only after the p presses '6' on the main menu to end the program. number of correct answers out of the number of attem problems is shown, along with the percentage of co answers. The number of rounds which were aborted is displayed.

Mathfun has excellent sound effects but could use improvement in the graphics department. It is defin a useful program for students in third grade through mi school and possibly high school.

(Compugram, Box 26663, Richmond, VA 23261, casset $10)

— Davi

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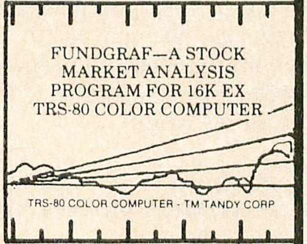

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Space Web Teaches trategy And Reasoning Skills

\s you beam through hyperspace going many times the ed of light, you see something in the distance. As your ɔ gets closer, the faint object begins to take shape. You ice something familiar about the object, and as it gets ser, the terror grips you.

Oh no," you yell, "it's the dreaded space web." As the ɔ surrounds your ship, you know that your only hope escape is to change the color of the web walls to the get color and make the web dissolve.

Vo, you're not in the newest ship of the 21st century. u're not even in the next *Buck Rogers* episode. You're ying *Space Web*, the newest creation from Spectacular ftware. *Space Web* is a 32K high resolution game that uires joysticks.

The scenario is as follows: Your objective is to escape dreaded space webs that inhabit hyperspace as you empt to pilot your spaceship to its destination. To do ; you must change all of the sides of the web to the get color which is displayed at the upper right-hand rtion of the screen. Each time you hit a side of the space ɔ you change its color.

The joystick is used to control the direction of your ship. When you are the farthest away from a wall, you must move the joystick in the direction you want the ship to go. You must go to an adjacent wall. In Level one you can bounce off of a wall three consecutive times before your ship will be destroyed. As you get to the higher skill levels the amount of consecutive times you may bounce on a wall decreases.

There is also a time limit on each level of play. The time is the same on each level, but as you reach the higher levels the clock moves faster.

Space Web seems to be a game for the younger generation (about 8-10 years old) because it teaches strategy and reasoning skills which are very essential. Also, the first time that I played the game, I got to Level six (there are only nine levels).

Many improvements are needed to make this game a good one. One suggestion would be to make it more of a shoot-'em-up, while still teaching strategy and reasoning skills.

I find *Space Web* to be tedious, but a good learning game. It isn't outstanding like the new games that we have been seeing lately. I will give it three stars — an average rating.

(Spectacular Software, P.O. Box 363, Mansfield Center, CT 06250, cassette or disk $19.95 plus $1.50 S/H)

— Pat Downard

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from eryone. We like to run a variety of programs which will useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it best to make several saves, at least one of them in ASCII rmat. We're sorry, but we do not have time to key in ograms. All programs should be supported by some itorial commentary explaining how the program works. enerally, we're much more interested in how your bmission works and runs than how you developed it. ograms should be learning experiences.

We do pay for submissions, based on a number of criteria. ıose wishing remuneration should *so state* when making bmissions.

For the benefit of those who wish more detailed infor-ation on making submissions, please send a SASE to: ıbmissions Editor, THE RAINBOW, The Falsoft Building, ospect, KY 40059. We will send you some more mprehensive guidelines.

Please do not submit programs or articles currently bmitted to another publication.

E.T.T. Electronic Typing Teacher
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Multiple Choice Test Fits Specific Needs

Teachers, what is the best way to prepare a multiple-choice test? D & D Software believes that *Multiple Choice Test* is the answer. I wish I could say the same. Writing multiple-choice tests is inconvenient at best. Any program designed to make the job more convenient has potential. I'm sorry to say that *Multiple Choice Test* simply doesn't make the grade in my book. The program has many limitations and anyone contemplating its purchase should look very closely. You may find that it isn't right for you.

The program aids in the writing, printing, storage and grading of multiple-choice tests. One section allows you to enter test questions, choices and correct responses. It is this section which is most restrictive. The program allows questions to be a maximum of 96 characters long. This is far too short for many of the questions I regularly use on this type of test. The second restriction is in the number of possible choices. There can be only three. All of the multiple-choice tests I have seen recently have four or five answers from which to choose. If the program allowed two choices, it might be useful for true/false-type tests, but three choices is what you get and that is unnecessarily restrictive. Each answer choice can be up to 64 characters long which is less of a problem than the length limitation placed on questions.

The ability to edit questions hardly exists. That is ur you consider reentering an entire question as editing. T is no provision for using pieces from two or more to form a new test, so you cannot keep blocks of quest and build tests from them. There is also no provision mixing the order of questions on a test or of mixing order of the answer choices for each question. It w be handy to be able to do either of these things so different versions of the same test could be produced security.

The production or printing of the tests is ano problem. There is no provision for changing the stanc format which is: no left margin, one line between e question and the first answer choice and one line betv answer choices. The program doesn't compress three s answer choices onto one line to save space, so a 50-ques test will take something like eight pages to print. T is not counting the answer sheet.

There are two other main options in addition to above. The first allows one person at a time to tal test on the computer. That could be useful under cer circumstances. The last option has the potential of b the most useful.

The program allows rapid entry of student respo to a test. This allows you to grade tests using the compu There is little real advantage to using the computer grading tests. But, since the answers are stored for e student, there is the possibility of using the data gath in this way for test analysis.

Overall, the program operates somewhat sloppily. main menu jumps every time it is presented. Thi apparently due to the addition of choices to the menu after the original program was written. There is als bug in the file save routine. If you hit the ENTER ke response to the filename prompt when the test is to saved, the program enters an endless loop and the you just entered is lost.

There is certainly a need for a good, flexible multi choice test generating program in the educatic community. Right now a good word processor will do job, but something better suited to the job would welcome. *Multiple Choice Test*, however, is not program. Unless your test writing needs specifically fit program, I would recommend a good word processor.

(D & D Software, Rt. 2, Box 47, West, MS 39192, 32I disk $29.95)

— Donald L. McGa

BASIC COMPILER

WASATCHWARE believes that users of the Color Computer deserve the right to use all 64k of RAM that is available in the computer, and have fast machine language programs that use the full potential of the 6809 microprocessor. That is why the BASIC compiler, called MLBASIC was developed. Here are some of the reasons that make this compiler one of the best bargains in this magazine:

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SOMETIMES I'D RATHER **DuduL**

DUDUL is an entertaining graphics doodling program with the usual things like line, box, paint, and circle drawing, plus some very unusual things like chained parallelograms. Joystick function selection. On screen menus. 20 drawing functions Pattern painting. Text. Undo. Condensed Disk/Tape Filing PMODE3. 64K Extended Basic. Sent on tape. Disk optional $22 + $2 shipping. MO residents, 6% tax. Check or M.O payable to Doug Dugan. 4514 Wichita, St. Louis, MO 63110

Personal Finance System
or Checkbook Organization

By Dennis A. Church

Personal Finance System is a disk-based checkbook filing gram with some additions, requiring a 32K CoCo. It nes in a half sheet-sized envelope with a single diskette d 11 pages of legible, clearly-written documentation.

My first hour of working with the program led me to conclusion that it had a bug. It would not allow the ation of the user's own checkbook file. When I called mputerware, they were friendly and aware of the blem. My original program disk was sent and returned h the "debugged" program in a week and a day.

Personal Finance System or *PFS* consists of 12 individual k programs in BASIC which are constantly being swapped the program is used. Generally this is no problem as y load quickly and the full range of options remains ilable, through menus, from any program in memory. e BREAK key is generally disabled. There are times, ecially in the Loans/Investments section, when the gram indeed broke, but typing `RUN` quickly returned l function without loss of data. The program is protected, and the user is instructed to make a backup the original disk for use.

The meat of *PFS* is the checkbook file function. This creates a file of your checking account transactions that includes check (or deposit) number, date, payee, amount and budget account. The checking account balance is constantly updated and displayed when entering transactions. When entering checking or deposit information, any item can be revised before adding it to the record by simply choosing the number next to the item. You then replace that item with corrected data.

You also have the options of dropping the entire entry, adding it to the record, returning to the menu or continuing with the next transaction. Listing pre-authorized deductions or ADT withdrawals is taken care of by clever numbering. The documentation suggests using 99990-99999.

PFS periodically and automatically writes new data to disk. There is no "save records" option accessible to the user. When first using *PFS* you should select Change Startup Information from the menu. This introduces a menu that allows you to select or initiate a new checkbook file, set the printer Baud rate, determine the number of disk drives you want to use and choose whether or not to automatically load the indicated checkbook file. With a single disk drive, the documentation says up to 1,300 check and deposit transactions can be accommodated on the program disk. Using more drives for data-only disks gives 3,000 transactions on each disk.

Another process that must be undertaken before serious data entry is to customize the Budget/Expense categories to reflect your own financial situation. There are 48 possible accounts with which you must classify each check or deposit entry. There is a demonstration file on the *PFS* disk.

On the last page of the documentation is a sample

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printout of the accounts for this file. It shows account names, budgeted amounts, expenditures/deposits for the months and the amount over or under budget along with a summary of all figures. You will need to plan all account categories (including income) and amounts, then enter them into the Accounts/Budgets/Balance section of the program. The amounts may be changed easily. After checks are entered, the category names may not be changed, since they are tied to the data in the checkbook entries.

An interesting aspect to check entry is the feature that allows you to divide the amount of a single check if expenditures fit into more than one category. You may record the same check number as often as necessary, changing only the account category and the amount (to reflect only the portion of the check falling into that category).

The utility of the checkbook program lies in the fact that you can organize your income and expenditures by category. At the end of the year or quarter you may see totals of expenditures in tax deductible areas (contributions, for instance) or reports of sources of income (provided you deposited them in the checking account). The account balance can also be used in reconciling the bank statement with the checkbook.

Those summaries are all available as printouts only. Without a printer, some of the most useful options are unavailable to you. When "Print the Reports" is selected the records are automatically sorted and saved by date. You can then request deposits, expenses or account summaries for any range of dates. You may also limit the report to any specific account.

Before describing what is essentially a second, independent part of *PFS*, perhaps I should comment on the practice of using the computer to do what your checkstubs l been doing for years. If you're wondering whether to b using a program like this you need to realize that will be recording every transaction twice: once in checkbook and once later on, sitting in front of the Co Is it worth it? You need to answer several questions.

Do you need easy access to expense summaries at time? Are you trying to stick to a rigorous monthly bud Is it time you pinned down exactly where your mc is going, and is it important to know if that pattern su changes? Are monthly summaries of your finan transactions important to you? If your answer is yes, t *PFS* will do well for you.

This package contains more, however, that may incr its worth to you. Two additional options on the main m are Compute Loans and Compute Investments. This is my specialty, so I asked a friend who is an insura investment counselor to explain some of the terms to Selecting these options loads a program that will comp a total of 18 different aspects of loans and investme These include principal, payment, last payment, real te and annual terms for loans.

The program will print out a mortgage loan amortizat table and a declining interest loan table. The Investm module includes computations of the value or future v of an investment or regular deposits, amounts of in investments needed for regular withdrawals, and nom and effective interest rates. It will also generate a prin table of earned interest on an investment. If you underst all these terms easily, you best know your need fo program that quickly and easily computes them. Tha not to say the average person can't find use in then have computed that if I want to have a decent retirem income I had better boost my IRA deposits dramatical

Personal Financial System is a well-written checkb record entry program, with handy extra features. It clear, though not exhaustive, documentation and effec error handling. Its use of disk access does a good job fitting large data areas and program features into 32K.

(Computerware, P.O. Box 668, Encinitas, CA 92024, dis $27.95)

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One-Liner Contest Winner . . .

Happyface is a graphics animation program that shows an animated head with moving lips. This should entertain the kids for hours . . .

The listing:

```
0 PMODE4:PCLS1:SCREEN1,1:COLOR4:
CIRCLE(128,96),96,,.9:CIRCLE(75,
60),15:PAINT(75,60):CIRCLE(180,6
0),15:PAINT(180,60):CIRCLE(128,8
4),15:FORR=1TO9:FORX=.02TO.4STEP
.02:CIRCLE(128,138),49,,X:NEXT:F
ORY=.4TO.02STEP-.02:CIRCLE(128,1
38),49,1,Y:NEXTY,R
```

Doug Wylie
Mentor, OH

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

PIZZA
PALACE

BUT...CHECKERBOARDS ARE FOR TABLECLOTHS!

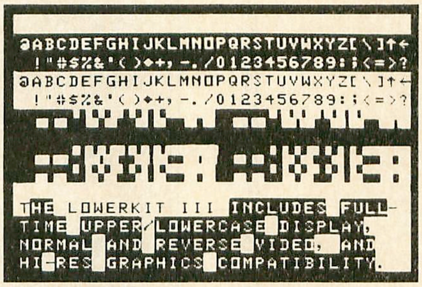
THE LOWERKIT III FROM GREEN MOUNTAIN MICRO

Still cloaking your Color Computer in a checkerboard tablecloth? Since 1981, thousands of Color Computer users have uncovered their computer by discovering the Lowerkit — the first and best full-time lowercase and special symbols generation system for your Color Computer.

Why a Lowerkit? Because uppercase-only display is a relic of the user-unfriendly past. And because you can't really read a checkerboard excuse for lowercase display. Sure, software lowercase comes with a handful of commercial programs. But software lowercase gobbles up over 6,000 bytes of your precious memory. Even if you have 64K, you'll give up 10% of it for a simple lowercase display. And software lowercase vanishes when you change programs or turn off your computer.

Take 15 minutes. Put the Lowerkit in. A Lowerkit is simple, reliable — and it's always there. You flip on your machine, and Lowerkit's bold lettering greets you. No tapes, disks or cartridges to load first. No compatibility problems; when you don't want it, you switch it off.

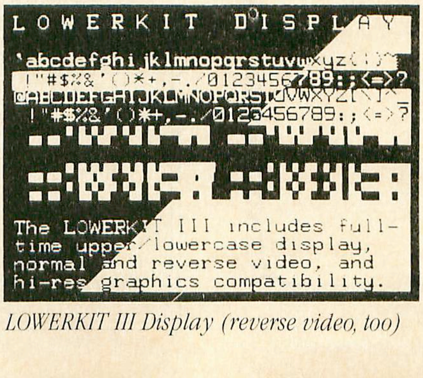
And now, the new Lowerkit III includes a reverse screen switch as well. Big, bright green letters on a black background.



```
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←
 !"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←
 !"#$%&'()*+,-./0123456789:;<=>?

THE LOWERKIT III INCLUDES FULL-
TIME UPPER/LOWERCASE DISPLAY,
NORMAL AND REVERSE VIDEO, AND
HI-RES GRAPHICS COMPATIBILITY.
```

Original Color Computer Display



```
LOWERKIT DISPLAY

`abcdefghijklmnopqrstuvwxyz{|}~
 !"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
 !"#$%&'()*+,-./0123456789:;<=>?

The LOWERKIT III includes full-
time upper/lowercase display,
normal and reverse video, and
hi-res graphics compatibility.
```

LOWERKIT III Display (reverse video, too)

Four years ago, the Lowerkit made history and set the standard in Color Computer lowercase. For example, game and education programs from Sugar Software have Lowerkit display options. Spectrosystems' ADOS supports the Lowerkit; so does Cer-Comp's TextPro. Cartridge Scripsit looks beautiful with a Lowerkit. Spectrum Projects, Cheshire Cat and many others have developed beautiful alternate character sets which you can download from Micronet, burn into an EPROM, and snap into your Lowerkit.

Pull the checkerboard tablecloth off your Color Computer with a **Lowerkit.** The original. The standard.

New Low Price on the Assembled Lowerkit III!

- Lowerkit III, assembled and tested, $67.50
- Lowerkit III, complete kit of parts, $49.95
- Lowerkit III, printed circuit board, $20.00

Be sure to specify Color Computer or Color Computer 2.

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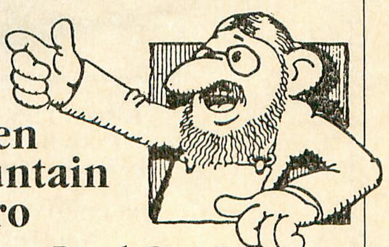
**Specify Color Computer or CoCo II*



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ACCOUNTS RECEIVABLE Includes detailed audit trails and history reports for each customer, prepares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accounting package. $49.95

PAYROLL Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Additional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware. $49.95

All programs require a printer and a minimum of 32K and 1 disk drive but will take advantage of 64K and 2 drives. Each package features a hi-res 51 x 24 black on green screen.

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Software Review

Handycode — An Efficier Way To Keep Data Privat

Handycode is an encryption program for the s(storage of small lists of information. Most people a time or another have a need for the safe storage of sen or personal data. *Handycode* is just the program they

With *Handycode*, they can enter a list of such t as passwords they wish to keep secret, phone numbers wish to keep private or even confidential records fron office.

When *Handycode* is `LOAD`ed and `RUN`, a standard page with a prompt for encryption or decryptio displayed. Having entered your choice, you will be a for your secret password needed to gain access to list. If you choose to encode, you will be allowed to your list which will be saved in coded form to tap disk. If, however, you choose to decode, the program immediately search for your file and proceed to de it, listing it on the screen as it does.

Handycode, written for 16K ECB, is just what it cl to be: an efficient way to keep your information safe only real drawback is when using the disk version, must rename the file before working with another li feel the author could have improved on the produc allowing the user to input the filename of his or her ch

(V. Baumann, P.O. Box 415, Hammond, IN 46325, 16 ECB, cassette $18.50, disk $19.50)

— Stephen

One-Liner Contest Winner . . .

This one-liner is a mini word processor which run on a 16K ECB CoCo. The program prints only on line at a time, but you don't have to worry abou splitting a word in the middle.

The listing:

```
10 CLEAR 500:PRINT #-2,CHR$(26)
LINE INPUT D$:L=LEN(D$):FOR X=1
TO L:M$=MID$(D$,X,1):PRINT #-2,
$;:IF X>70 AND M$=CHR$(32) THEN
10 ELSE NEXT X:GOTO 10
```

Elizabeth Ligo
Miami, F

(For this winning one-liner contest entry, the author has been sent copi of both *The Rainbow Book Of Simulations* and its companion *Rainbo Simulations Tape*.)

Create Animated Graphics With *Animator Junior*

nimator Junior, a recent release by Triad Pictures poration, is a simplified version of their 64K *Animator nmercial* program which was designed for commercial Animator is a graphics/animation program that allows ser to create animated graphics for enjoyment or BASIC gram use. The *Animator Commercial* program was ewed in the January 1985 issue of THE RAINBOW. *mator Junior* uses 16 cels or 500 frames which gives ut one and one half minutes of continuous animation. *ior* requires 16K of memory and uses "semigraphics" ow resolution graphics.

encountered two problems in using this program. First, program will not work with a disk system connected e computer. The problem is not the amount of memory led to operate the program, but the location in which machine language program resides. The program does claim to work on disk systems, but I feel the user ld be informed in the documentation that the disk em needs to be removed. Personally, I feel the program ld be adapted very easily to a disk system by adjusting memory locations.

he second problem was a syntax error in Line 0 of BASIC *Loader* program. For my computer, the problem a `PCLS4` statement that should have been `PCLS 4`. error caused other problems by preventing the machine guage subroutines from being loaded until the computer reset. The documentation attempts to help you with ding difficulties, however, this problem was not tioned.

he program uses four menu options to develop low lution animation. The CEL-STUDIO is where you te the screens (or frames) in your animation. A cel is a simple drawing and contains one frame. Using the arrow keys to move the cursor around the screen, you draw your picture using various colors. You can move from cel to cel by using the left- and right-arrow keys. A help screen is always available to assist you with color changes and erasing. You can write on the screen using the CoCo's letters by pressing the '@' key. There is also a "copier" that allows you to copy the contents on one cel to another. This is good for continuity.

Once the cels have been created, you sequence them. This is where you put the show together. This is like shooting an animated cartoon on film. You select a cel, shoot a frame of "film," select another cel, shoot it, etc. Then, when the frames, or cels, are displayed in sequence, you create an illusion of motion. The SEQUENCE option also has a help screen to assist the user.

To see your creation, use the DISPLAY option. The display option allows you to view your film one time or you can select a continuous option. This is a nice feature and opens up many options to the user.

The final menu selection is the CASSETTE LAB. Here is where you can `SAVE` and `LOAD` previously created shows. The documentation gives instructions for using the created animation in your BASIC programs. Also, two demo programs are included on side two of the tape. The first demo is a "slide show" presentation of a little man "waving." The second demo is a simplified demonstration of the piston action in an internal combustion engine.

Aside from the loading problems I encountered, *Animator Junior* is a well-developed and professionally written piece of software. I would consider this excellent educational software and just plain fun for anyone. The price is great and affordable for all. For program developers, you could create some fantastic title screens and menus with the help of *Animator Junior*.

(Triad Pictures Corp., P. O. Box 1299, Sequim, WA 98382, cassette $16)

— J.D. Ray

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32K, one joystick required.

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An adventure game with all the excitement of arcade action.

Earth is infested with intelligent killer bugs. Find your way through the maze and destroy their reactor. However, you must fight the bugs all the way!

New and improved version of the game that won the Color Computer Magazine® programming contest. 64K required.

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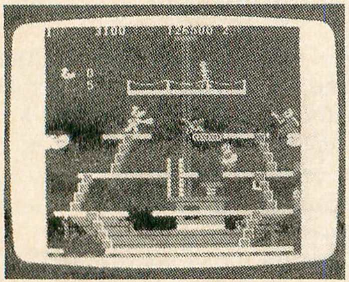
GAMES

THE SAILOR MAN

TAPE $29.95
DISK $34.95

The first screen objective is to catch enough of Elsie's kisses (those Red Heart Shaped Things) to fill in the squares on the Sailorman's house. If you can time your punch just so, you can send the punching bag over to knock the bucket down and, with a little bit of luck, right on **Bigfatbadguy's** head. This will give you a little (but not much) time to catch all those RHSTs.

You must avoid contact with **Bigfatbadguy** who is actively pursuing you. You must also be careful of **Olduglyseawoman** who will appear at higher difficulty levels to chuck empties at you. Either avoid the flying bottles or punch them (with the fire button) to keep from being knocked into the water.



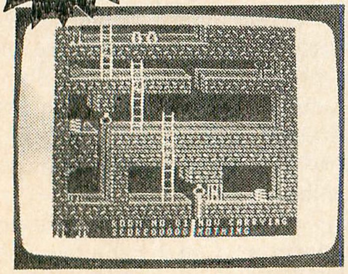
The second screen objective is to collect enough notes to play Elsie a little love song. You may jump off and onto the other end of **Fatguyeatinghamburger's** teetertotter to fly up a deck and even two decks if you manage to catch hold of **Smartaleckkid's** grab handles. Time it right and away you go.

The Third screen objective is to collect enough letters (thrown by Elsie's cries for H-E-L-P) to complete a ladder all the way to the crow's nest where Elsie is calling you. Beware of the Crow, however, who thinks you are after her eggs!

On all screens, eating a can of collard greens (labeled "S" for Collard and grasped by punching the can just right) will give you amazing speed, strength and ability and allow you to send **Bigfatbadguy** into the drink with a single punch.

NEW! DRAGON SLAYER

Save the villagers of Pendor! They live in fear of Icarus, the blood thirsty dragon. The dragon lives in a cave, way up in the mountains. The cave is a treasure chest, full of gems and cashbags. The trail to the cave is as menacing as Icarus himself. You will have to secure the necessary equipment to climb the rocks and cross the rivers and chasms along the way. Be on the lookout for enemies and barriers at all times.



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NEW! EDUCATIONAL

FACTPACK

FACTPACK is a set of 3 programs designed for h or school use. The programs provide drill practice with basic addition, subtraction, m plication and division facts and are appropriate in grades 1-6. Each program requires a Extended BASIC Color Computer. Disk drive and printer are optional.

Requires 32 K Ext. Basic **Tape $24.95** **Disk $2**

TEACHER'S DATABASE II

Teachers' Database (TDB) is a program designed to allow a teacher to keep a computeri file of information about his/her students.

The program requires a 64K Color Computer and at least one disk drive. This comple revised program includes all of the capabilities of the original TDB plus many new featu

- Information on as many as 100 students, or more, may be in the computer at one ti
- Each student may have as many as 20, or more, individual items of data in his/her rec
- The program has many easy to follow menus.
- Records may be easily changed, deleted, or combined.
- Information about students may be numerical or text.
- Records may be quickly alphabetized or reordered based on their contents.
- Records may be sored by various criteria.
- A full statistical analysis of scores may be done and sent to the printer.
- Student test scores may be weighted, averaged, changed to a percentage or chan to a letter grade.
- Individual student progress reports and class gradebook sheets may be printed.
- Three methods of data entry spped the task of typing in student grades and test resu
- The program may be easily customized to work with any printer.
- Student seating charts may be created and printed.
- Graphs of student test results may be created using the computer's high resolution gra screen.
- Grade distribution can be displayed numerically or as a histogram.

Requires 32K Ext. Basic **Tape $39.95** **Disk $42**

VOCABULARY MANAGEMENT

Requires 16K Ext. Basic or 32K for printer output.

The Vocabulary Management System (VMS) is a series of programs designed to aid a par or teacher in helping children to learn and practice using vocabulary and spelling words. 11 programs that comprise the VMS include a full feature data entry/edit program, three pri output programs and 5 vocabulary/spelling game programs. The system's many outstand features include:

- As many as 300 vocabulary words and definitions may be in the computer's memor one time.
- Words and definitions may be saved on disk or tape.
- Remarks and/or comments can be saved with word files.
- A disk loading menu allows students to load disk files without typing file names.
- Word lists may be quickly alphabetized.
- The three printer segments allow you to create and print individualized tests, puzz word-searches and worksheets.
- The printer segments allow full use of your printer's special features.
- The 5 game programs are based on sound educational principles and provide pract in identifying words and matching them with their definitions in a fast-paced set of activiti

TAPE $39.95 **DISK $42.95**

FRACTIONS - A Three Program Packag

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2. Practice converting mixed numerals to improper fractions.
3. Practice converting improper fractions to mixed numerals.
4. Practice of both types. (Mixed to improper & improper to mixed)
5. Review converting mixed numerals to mixed numerals. (Used in regrouping in substractic
6. Practice converting mixed numerals to mixed numerals.

EQUIVALENCE

1. Definitions of terms and review of finding equivalent fractions.
2. Practice finding equivalent fractions.
3. Practice finding sets of equivalent fractions.
4. Review of dinding if one fraction is equal to, not equal to, less than or greater than anot

LOWEST TERMS

1. Review of placing fractions into lowest terms by dinding the greatest comon factor (G of the numerator and denominator.
2. Practice finding the GCF of pairs of numbers.
3. Practice placing fractions into lowest terms by finding the GCF of the numerator a denominator.

32K EXT BASIC **TAPE $30.95** **DISK $35.**

MATH DUEL

MATH DUEL is a challenging mathematics game that pits you against the computer in a ga of wits. You must use all of your knowledge of factors, multiples and prime numbers to deve a strategy that allows you tog ather more numbers and thus more points than the comput

The game is deceptively simple. you select the size of the playing field that is composed from 8 to 100 numbers. You must then choose numbers that will give you the maximum num of points and the computer the least number of points. There are only 6 rules.

32K EXT. BASIC **TAPE$24.95** **DISK $29.**

SIMULATIONS

51 Mustang
Attack Flight
Simulator

JUST IMAGINE! Your movements are shown at any remote CoCo across town or across the country. It's hard to believe it's simulation.

40 shown.

P51 Mustang

Attack Flight Simulator

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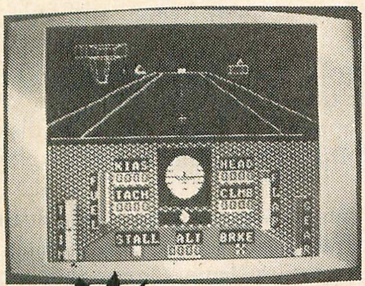
32K Machine Language Tape $29.95 Disk $34.95 Cable $10.95

Worlds of FLIGHT

Jump in the pilot seat - not a game - A realistic Flight Simulation

C.L. - "As a pilot I found "Flight" to be an outstanding simulation".

WORLDS OF FLIGHT (WOF) is a "view" oriented flight simulation for the TRS-80 Color Computer, written entirely in Machine Language. "View" oriented means that the pilot may determine his or her position by actually viewing the surrounding landmarks as opposed to using instruments which sense navigational references. This is a major departure from "instrument only" simulations which can be achieved through BASIC programs. Most instrument maneuvers and procedures may be practiced. The craft is a light-weight, single-engine airplane with low wings. A nose wheel which is both steerable and retractable is also modeled. Some aerobatics are possible including sustained inverted flight, aileron rolls, spins and stalls.



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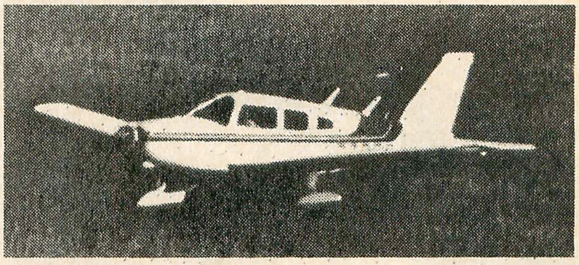

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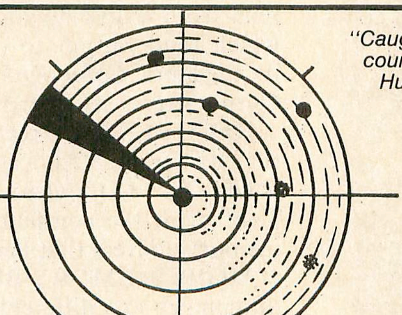

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Color Disk Manager — A Virtual Disk Saver

By Lewis R. Jansen

In the two years that I have had my disk drive, I have occasionally had a disk go bad. This has ranged from a single sector on the disk being trashed to most of the directory track getting erased. The latter happened only once but, fortunately, the Granule Allocation Table (GAT) survived. I was therefore able to rebuild the disk.

Good computer habits include making sure you have at least two copies of every program, preferably on different disks. Nobody is perfect, however, and I often have only one copy of something or only one copy of the latest update. What happens when you get a problem with the disk? Unless you know the Color Computer DOS well enough to rebuild a directory, you are probably stuck.

Enter *Color Disk Manager* from Sugar Software. This utility is pretty much an extended disk-zap program. By extended, I mean that this program supports 37 different commands. For a better picture, I'll go through some of them and give a brief description of each.

LOAD SECTOR loads a sector into memory fr
anywhere on the disk, and LOAD TRACK does the sa
thing, but for a disk track.

SAVE SECTOR saves a sector to the disk, and SA
TRACK does the same for a track.

LOAD FILE ADJusted loads an entire file from d
removing header bytes if necessary. (Header bytes are u
on binary files to tell BASIC where they are supposec
be loaded.)

LOAD FILE NORMAL loads the file into mem
but leaves the header bytes (if any) intact.

SAVE FILE saves a file to disk, and allows you to cha
the start and exec addresses of machine language files.

SAVE MEMORY BLOCK saves a block of mem
as a machine language file on the disk.

BACKUP is one of the more useful commands. It all
you to back up any number of tracks on the disk.
can back up anywhere from one track to an entire d
If it is unable to read a bad sector, it will notify y
put a sector full of carriage returns (ASCII 13) in pl
of that sector, then continue.

DIRECTORY does a directory of the disk, gives
number of free granules and the number of free by
if the number is below 65535.

FILE MAP gives you a list of the tracks, sectors
granules occupied by the file that you specified.

RAPID SCAN lets you look around on the disk.
displays the current sector in ASCII and lets you m
around on the disk with the arrow keys. The left-
right-arrow keys change the current sector, while the
and down-arrows change the track. This is handy if
want to either search for something or look at a particu
sector.

ALLOCATION MAP displays all of the granu
showing the track and first sector for each, and tells
which granules are in use.

INITIALIZE allows you to erase and reformat any ra
of tracks and will handle tracks above the 35th.

APPEND SECTOR appends a sector from the disk
the end of the memory buffer. Used primarily in recover
crashed files.

CHANGE DRIVES allows you to change which dr
is being used. It is possible to set one drive as the In
drive and another as the Output drive. Commands wh
read from a disk do so from the Input drive. Comma
which send output to disk send it to the Output dri
At the start, *Color Disk Manager* has both the Input a
Output drives set as drive 0.

RECOVER FILE recovers a file from the disk, provid
that the Granule Allocation Table is still intact.

GO TO ADDRESS acts like an EXEC from BAS
Control of the computer is passed to the routine at
memory address that you specify.

MOVE MEMORY BLOCK allows you to move a bl
of memory to a different spot.

DECIMAL TO HEX and HEX TO DECIMAL
numeric conversion for you and EXAMINE MEMO
lets you look at, and change if you want, an area in memo
You specify the location to start at and can move arou
with the up- and down-arrow keys. Memory can
displayed in Hex, decimal or ASCII.

ASCII DUMP dumps the contents of memory starti
at the address you specify to the screen in ASCII form
During the dump, you can pause or exit at any time.

CHANGE FORMAT changes the default output form

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default can be either Hex or decimal. An option lets
choose whether or not to be prompted for the format
n a command offers both.
OM TO RAM turns the 64K mode on and then copies
ROMs to RAM; EXEC ROMPAC turns on the 64K
de, moves a file from the buffer to the memory that
OM pack would normally occupy, and then executes

APE LOAD loads the next file from tape into the
fer. If it is a binary file that resides in the same memory
Disk BASIC's variable and buffer storage area ($600-
0), you will be asked if you want the program converted
t will load and `EXEC` properly from a disk.
KIP FILE searches the cassette for the next end-of-
block. It doesn't verify the cassette data like `SKIPF`,
t can be used in the middle of a cassette file without
ble.
OAD GRANULES loads a range of granules from the
into the buffer as a file.
VRITE PROTECT ON-OFF lets you enable/disable
oftware write-protect switch. When enabled, any
mand that writes to the disk will abort.
here are also two subroutines included with the
gram. By typing `TRKF/SUB` you will find out what file
s a given track and sector and typing `HIDEGRN/SUB`
protect/unprotect a granule from BASIC. HIDEGRN
andy for hiding a bad granule from BASIC when the
of the disk is still good.
n to the 29-page manual which came with *Color Disk*
nager. In a word, excellent. I didn't find any major
ographical errors and everything is thoroughly
lained. All of the commands are explained, as well as
rything you need to know in order to effectively use
program. It does not, however, re-explain Chapter 11
the *TRS-80® Color Computer Disk System Owners*
nual & Programming Guide which you get when you
your first disk drive system. I suggest you read that
pter before reading the *Color Disk Manager*'s manual.
here are two things that really should be added to this
nual: an index and table of contents. I would find myself
gering through the manual in search of the description
a command, when an index could have told me the
ct page immediately.
he program itself is menu driven. In other words, you
er choose an item from the current menu, or hit BREAK
get the next menu. There are four different menus, and
can only move to the next; there's no going back.
course, when you go past the last one, you go back
the first. I found it irritating to have to go through
e menus to get back to the one I just passed. Another
should be added for going backwards. That's the only
blem I had with the program.
ll in all, *Color Disk Manager* is a professional package.
loes require a 32K Color Computer (minimum), but
elieve that 32-64K has now become the standard for
systems. Should you buy this program? It depends
n your needs. If you can never remember to make sure
have backups of programs, then I suggest you get
For $35, it provides a lot of insurance against losing
ny hours of work.

Sugar Software, 1710 North 50th Ave., Hollywood, FL
3021, 32K disk $34.95 plus $1.50 S/H)

Cassette Tape Tester Affords Security For Data

The review copy of *Cassette Tape Tester* (*CTT*) arrived — on a disk marked "Generic Mini-Floppy Disks" — with no real name or address, no real documentation (the page of instructions is a printout from the disk itself) and no indication of what CoCo configuration it is meant for, beyond a penciled note "16K tape or disk" on the upper right-hand corner of the instruction sheet. As it happens, you need no more than that.

When you `LOADM` the program you learn it was written by Bill Nethken and distributed by Free CoCo Software. They hope if you like the program you'll send them whatever sum you think it is worth. I like the concept. The distributors should welcome the private circulation of backup copies, as it would multiply their chances of seeing some return on their investment without multiplying their investment, but they have retained copyright on the program and anyone caught selling it would be subject, quite rightly, to prosecution.

The program itself is simple enough. It writes a stream of data to a previously erased tape and then reads the data back to determine whether the tape is faulty. The instructions are clear about how to do this.

How well does *CTT* work? Well, it does what it claims to do. I found it reported a bad read about one time out of five on the same tape, but who is to tell what transient bobble in the power supply might have contributed to that? The instructions recommend you test the tape twice; a few more tries will hurt nothing. After using the program a cold start will be necessary, as it does lock up the computer.

CTT affords some additional security for data stored on tape, and even those who have gone entirely over to disk may find this helpful if they use cassettes for any purpose, such as archival backups of disks. And who can complain about the price?

(Free CoCo Software, Box 2231, Westover, WV 26502, machine language, 16K cassette or disk. Contributions accepted.)

— R.W. Odlin

Hint . . .

64K Memory Upgrade: CoCo 2 With Eight RAM Chips

Install a set of 4164 64K RAM chips in place of the eight 16K RAM chips near the lower right corner of the board. On U.S.-made CoCo 2s, solder together the two adjacent PC board holes marked W1 next to the 6822 chip. On Korean-made computers, connect the two holes together in the white box marked 64K.

ANIMATOR COMMERCIAL
Creates Eye-Catching Displays

I can remember in grammar school how I used to draw little stick figures on the page margins of my textbooks and flip the pages rapidly to produce crude animation.

ANIMATOR COMMERCIAL provides the 64K Color Computer owner with a color animation studio of limited capability.

Two versions of the program are supplied on the cassette which is not copy-protected. One is the semigraphics version, while the other employs a screen resolution of 128 by 96.

After you `CLOAD` the BASIC program and run it, the tape recorder loads in a machine language subroutine. After it loads, you are greeted with `UL ERROR IN 1`. The Line number 164 referenced in Line 1 does exist but the ML routine seems to interfere with the stack or some essential pointers. If you type `RUN` again it seems to work without problems.

Demos are provided to allow you to see right away what can be done with *ANIMATOR COMMERCIAL*. In the Hi-Res mode, 12 screens or cels are available, while the semigraphics mode has 100 screens.

In *ANIMATOR COMMERCIAL*, you draw the background and copy it to other cels and make s changes or additions to produce motion effects.

The graphics editor allows you to set points, draw or circles and paint, using one of two available colo of four colors each in the Hi-Res mode. The semigra version lets you put eight color graphics block chara on the text screen.

Creating cels can be a long and tedious job with a mi possibly spoiling many hours of work, but the edito a very useful feature that allows you to view each add or change in artwork before it becomes finalized.

Once the cels you have drawn are to your satisfac you use the sequencer to program which cels wi displayed and for how many seconds (one through seconds range). After all this work you are finally rewa with the fruits of your efforts.

Except for the aforementioned bug, the program produce simple slide shows and animation-like ef Rapidly viewing the cells gives the best effect but it do last very long (only two seconds when run from sta finish), but you may include an auto repeat that continually repeat the cel display for as long as you That two-second show is in sharp contrast to the t or four minutes it takes to save or load the cels from cas tape storage.

Simple instructions are given for appending animation cels to your own programs, but due to the of memory required to contain the cels, your prog will have to be fairly short to take advantage of this fea You must be very careful that your program doesn't memory containing the cel data.

The documentation is very well-written with step-by- instructions that are easy to understand and get you g in the minimum amount of time.

As a draftsman and artist with some professi animation experience, I find it hard to imagine an actually using this program to produce professional commercial animation as the name and advertisem claim. I do believe it has a lot of potential for use titler for homemade videos and for producing eye-catc sales displays.

Retailing at $50 a copy, *ANIMATOR COMMERI* is expensive, but for those interested in learning s fundamental aspects of animation, it may be just what are looking for.

(Triad Pictures Corp., P.O. Box 1299, Sequim, WA 9838 cassette $50)

— J. Michael Now

Hint . . .

64K Memory Upgrade: CoCo 2 With Two RAM Chips

The two-RAM chip CoCo 2s use the new 446 RAMs (or the NEC uPD41254) for the 64K upgrade Install a pair of these in place of the two 4416 RAM chips located between the gray sockets; connect th two holes together in the white 64K box on the lef side of the board.

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Missile Math Is A Winning Tool

When I first received *Missile Math* and saw it was written the Middletown Educational Software Association, I ondered if it was written by a group of teachers. Being eacher myself, I thought how great it would be to have achers writing educational software because they would ow what is needed in the classroom. The only thing tter than having teachers write the software, in my mind, ould be to have students, supervised by teachers, writing

I was pleasantly surprised when I called MESA about question I had concerning the program to find that it as, indeed, written by students; a third year high school mputer programming class which, for their final project, cided to write and market a program. This is the first their efforts and I am looking forward to seeing their ture projects.

Missile Math is written for 32K Extended Color BASIC ing either a cassette or disk drive. It comes with an eight-ige instruction book that not only tells you how to run e program but also gives ideas on how to use it in a assroom, hints on what to do if things don't work right id an evaluation form to send back to MESA after you ive used the program for a while. They have also included "summary of key functions card" which can be placed side the computer when the program is being used.

When you get *Missile Math* you are instructed to make backup copy to use, then either `CLOAD` and/or `RUN` the ogram. After an initial display of a missile destroying city, there are three choices you can make: 'I' for structions, 'R' to review addition tables and 'S' to start e game.

Missile Math is a drill and practice game with a tutorial ction designed to aid elementary students in addition. the game, students have 12 cities they protect by correctly iswering addition problems. There are 10 levels of oblems ('A' through 'J') ranging from simple facts to ur digits added to four digits with carrying in all columns. hese problems are shown at the bottom of the screen ong with a display showing the number of "smart bombs" ey have.

Students can acquire smart bombs in the five hardest vels by going through a two-minute drill answering ldition facts. They receive up to five bombs which can ien be used in the game if they get stumped on a problem.

After the problem is displayed, a missile descends toward city. During the first part of the game they descend slowly, it as the game progresses the missiles descend faster and ister. To get rid of the missile before it destroys anything, ie correct answer must be typed in and ENTER pressed. he missile will stop as soon as a key is pressed but there e only fifteen seconds to finish the answer before the iissile continues to descend and destroy a city. If students t the answer right and press ENTER in time, the missile destroyed. If they get the answer wrong, or take too iuch time, a shield or city is destroyed. This continues ntil all cities are destroyed or they press 'Q' to quit. When either of these things happen, the score is displayed and students are asked if they want to play again.

Besides being able to destroy missiles with smart bombs, it is also possible to receive help in answering problems by pressing the 'H' key in every level but 'A' and 'B', which are facts levels. If the 'H' key is pressed in levels 'C' through 'E' students can page through tables where they can find answers to facts and then return to the same problem to finish it.

In levels 'F' throught 'J', when the 'H' key is pressed, a lively tutorial with numbers moving around the screen appears, displaying answers and demonstrating how to carry if the sum of a column more than 10 is shown. Students are then given a new problem.

The students in my sixth grade class just love these kinds of programs. I had a couple of them come to my house to test their reactions and was not really surprised. Anything that has action, movement, color and sound immediately appeals to them and *Missile Math* has plenty of it all. A tutorial with a game that is similar to the popular game *Polaris* is a winning combination for getting students interested in doing math.

Missile Math covers the subject of addition in small steps allowing for students of all ages to have an enjoyable experience with the computer. The only suggestions for improvement that I have would be to include a menu where the speed of the missiles could be controlled, the number of cities limited and where an amount of time for playing the game could be set. I think if these suggestions became part of the program it would be easier for students to use *Missile Math* as a tool for competition and improvement between themselves and the clock. It would also give the program a little added versatility in a classroom where there are not many computers per student and time on the computer is a critical factor. I do not believe these areas of concern are serious enough to dismiss this program from consideration. *Missile Math* is a fine program to have and use.

I like *Missile Math* and would recommend it as a program worth the money it costs for several reasons. It is well-done and impressive. The graphics are effective. The scope and sequence of the curriculum are well thought out. The tutorial for levels 'F' through 'J' is very catchy. The manual that comes with the program is complete. And finally, I am very impressed with a teacher who would take the time and effort to not only teach computers and computer programming, but who would go the extra mile to provide direction and stimulation for students to start a business and achieve something with what they have learned.

(MESA, Middletown High School, Valley Road, Middletown, RI 02840, tape $24, disk $26)

— Tom Nedreberg

Hint . . .

To Hex With Decimal

To convert a hexadecimal number to decimal on an Extended BASIC machine, type `PRINT &Hxxxx`. To convert from decimal to Hex, type `PRINT HEX$(yyyyy`. Note that "xxxx" is a Hex number between 0000 and FFFF, and "yyyyy" is a decimal number between 0 and 65535.

File 64 Is A Great File System For Cassette Users

File 64 from Owls Nest Software is an excellent file system for those owners of 64K Color Computers without disk systems.The program will produce and maintain a data file of up to five fields (subcategories). The information may be sorted, modified, added to or deleted as desired.

Your data may be displayed on the screen or sent to your printer. The program is very easy to learn and comes with a brief but adequate set of instructions as well as a backup program tape for those who don't want to figure out how to make their own backup copy.

A database, for those not familiar with the term, is a computer file system that allows the user to store various related pieces of information (such as inventory, record collections, etc.) so they can be located and sorted in various ways and printed on the screen or on paper in an easy-to-use form. Some databases are quite complex and provide the user with so many options that they are almost computer languages in themselves.

File 64 is a database in its simplest form. It files, sorts and retrieves information much like a simple card file. The nice thing about such filing programs is they can be used fairly quickly and *File 64* is no exception.

On the plus side, *File 64* is extremely easy to learn. Nest Software has used extensive prompting so anyb who has used a file system before could probably use *64* without reading the directions. The instructions are written, however, and worth the 10 minutes or so it take the user to read.

After loading the program, the user sees a menu is self-explanatory. The first-time user will head for Input Data section and then will be asked to define to five fields for his file system. If, for example, the is of names and addresses, the first field would be nar the second, street address, and so on. After defining fields, the user types in the specific data and return the main menu to locate, modify, delete, sort, save, l show or print the materials. The screen always pron the action or actions that should be taken next.

File 64 will hold up to 250 records. A single record be up to 250 characters long. The program converts 64K CoCo into a true 64K computer and holds all data in memory until it is saved to cassette. Since m of the program is written in BASIC, if the user shc accidentally hit the BREAK key, or, for some reason an error message, the user is told to type `GOTO 5` anc the data in memory will still be there as the program resta

Sorting is very fast through the use of a machine langu routine. The documentation claims that a file of 200 recc can be sorted on three field levels in less than 20 seconc

As simple as it is, *File 64* lacks a number of thin would have liked to see in such a system. There is no to add data from various fields to form a summary fi The program is set at a printer Baud rate of 600 and user must do some poking to get it going at the popu higher rates. The report (printout) is limited to one forr

As a longtime disk user, I was a little bit skeptica to how fair I could be to return to cassette and rev a tape-based file program. I was quite impressed with h well *File 64* operated and how easy it was to learn. O Nest Software has done a very good programming job has put together a very neat and easy cassette-based fil system. The user should remember that this is not a su fancy relational database system but performs exactly advertised as an easy-to-use file system. What more you ask?

(Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363
64K cassette, $24.95)

— Brian Ja

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Hint . . .

What's Your ROM Version?

With all the talk about new ROMs, you may be wondering exactly which ROM you have. If you have an older CoCo with Extended BASIC, just read the version number of your Extended BASIC at the top of the screen on power up. Then, to see which Color BASIC ROM you have, type `EXEC 41175` and press ENTER.

If you have the new ROMs, Extended BASIC will be version 1.1 and Color BASIC will be Version 1.2.

On the CoCo 2, Color BASIC will always be Version 1.2 or 1.3 (which are functionally identical).

Golf Handicaps Keeps League Statistics Up To Par

Golf Handicaps is not a game and is a serious attempt provide a golf league secretary (or individual) a means computing golf handicaps for a group of players. The e of the group is adjustable, but the program user must into the program to modify the program line for nging numbers to suit the situation.

While the program was written to conform to the rthern California Golf Association (NCGA) rules, the ogram is open to modification to any local rules since material is supplied unprotected. Modification, wever, would require some knowledge of programming.

Unfortunately, in this part of Pennsylvania, the NCGA es were not available to refer to in doing this review. e best source of input came from the golf pro at the al public course. He noted that *Golf Handicaps* should very helpful to golf leagues in which different courses used throughout the season. *Golf Handicaps* provides use of the course rating which may or may not be r for the course.

Use of the course rating allows for equating the level difficulty of the course and the players' scores. Thus, scores for team members are computed against the urse rating, and the difference between the rating and re becomes part of the pool of differentials used to arrive the handicap. The program provides for the entry of differentials out of which the 10 lowest are selected arrive at the handicap.

As an example, after the program has been loaded and data file called up, each player would have a set of ferentials in the file and a handicap computed up to t point in time. Now, as a new set of scores is entered the result of the latest round of golf, the program allows the previous handicap to be used to adjust the score d then also compute a new handicap. The author warns user that it may take two to three minutes for each yer's history to be updated. (A machine language routine handle the math would really speed up the procedure.)

The program will supply the user with printouts of the yer's name, team number (if used), gross score for that y's play, the old handicap (from last entry), any justments required for bogies, the new handicap and a ce for "remarks" to be entered. The print routine is for an Okidata 82a with 600 Baud transfer rate. The thor has provided for the user to get automatically the mber of copies of the printout the user might need by t entering the number at the prompt.

A printout of the differentials table for each player is o available as a selection from the menu. Corrections the table are provided for in the program, so if a wrong re is entered for a player, it is no problem to correct.

The program was written by a golf buff because it has me traps and hazards. However, a user can play around se and establish an NCGA handicap. The first major zard is the all too brief instructions (a two-page printout), t the actual program is filled with REMarks which provide ditional insight into its operation. Since the program is supplied unprotected, it is possible (nay, necessary) to run a printout of the program for the additional information.

The second hazard occurs in entering the original data to establish individual files on each player. If the user should enter more than 20 differentials, the program goes "out of bounds" and all the data is lost. While it does not affect the program, the method of entry of data is a little strange in that after a score is entered, the information remains on the screen and the next entry is written over the last entry.

The program is supplied on tape, but is designed to be used with a disk drive and tape unit. When exiting the program, the data file of players and their scores is saved to the disk and two backups of the program and data file are saved to tape. The double save to tape is insurance, but if a disk unit is online, backups to disk are much faster.

About the only option this program did not include was getting a tee time at a public course! While it may not interest every golfer, it should be of special interest to golf league secretaries with a Color Computer.

(Don Hug, 1111 Terra Way, Roseville, CA 95678, tape $35, disk $39)

— Robert E. Foiles

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CoCo Enters A New World With *The Magic Box*

What's so magic about *The Magic Box*? Well, like magic it will allow you to read Level II BASIC program tapes from a Model I or III into your trusty CoCo. The *Box* part of this magic is a special cable that plugs into the right joystick port of the CoCo and the earphone jack of the cassette tape recorder. So what you get when you buy this package is a cassette tape, the cable and a four-page instruction sheet.

The instructions are quite clear and point out the many differences between the CoCo and the Model I/III computers. Paramount of course, is that while the CoCo uses a 6809 microprocessor, the Model I/III use a Z80, and for that reason machine language or "system" tapes from the Model I/III cannot be read. In fact, the CoCo's BASIC and the Model I/III's BASIC are also different versions of Microsoft's BASIC and some modifications to the programs after loading into the CoCo are often required.

The instructions do a good job in pointing out these differences and how to deal with them. Also noted is that Model I/III tapes load into the CoCo best when using a Radio Shack CTR-80A tape recorder. I can certainly attest to that statement! I could not get any Moc programs to load at all with my Radio Shack CC tape recorder that I normally use with my CoCo. Luc I had a CTR-80 on hand from my old Model I days it worked just fine.

A very good calibration technique is used with *The M Box* software to get the critical volume setting just when loading in the Model I/III programs. As you or may not know, the Model I is notorious for pain sensitive volume settings. The authors of *The Magic* were wise to recognize this problem and include a solu with the software.

I loaded in several Model I programs with little diffic but had to edit several lines to get the text to dis correctly on the TV screen. This is because the Mod III use 64 characters per line while the CoCo uses 32. O than that, and some other commands unique to the M I/III that had to be converted to CoCo lingo, it wo beautifully.

By the way, when the CoCo encounters one of t unique commands, it highlights it by inserting aste before and after the command. It's pretty simple from point to locate these bugs and edit them out.

Another point to remember is programs using grap will also come out looking pretty weird. That's bec of the different graphics capabilities of these comput The Model I/III have 1,024 PRINT @ positions while CoCo has 512. This makes it a real challenge to co some of these programs to work on your CoCo.

In spite of the many differences between these comp systems, *The Magic Box* offers a viable solution to t who have the patience to modify BASIC programs provides the CoCo user with a whole new spectrum software. So dust off those old Model I/III tapes and w the magic.

(Spectrum Projects, Inc., P.O. Box 21172, Woodhaven, N 11421, $24.95 plus $3 S/H)

— Jerry Semo

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One-Liner Contest Winner . . .

This program will alphabetize a set of strings. First enter the number of strings to be sorted, then ente the strings one by one. (Note: Be sure to include the spaces shown in the listing.)

The listing:

```
0 CLS:INPUT"#";N:DIMA$(N),B$(N)
C(N):FORX=1TON:INPUT"$";A$(X):N
XT:FORX=1TON:FORY=1TON:IFA$(X)>
$(Y)THENC(X)=C(X)+1:NEXTY,X ELS
 NEXTY,X:FORX=1TON:B$(C(X)+1)=A
(X):NEXT:FORX=1TON:IFB$(X)=""TH
NB$(X)=B$(X-1):PRINTB$(X):NEXTE
SEPRINTB$(X):NEXT
```

James Fowle
Glen Burnie, M

(For this winning one-liner contest entry, the author has been sent copie of both *The Rainbow Book Of Simulations* and its companion *Rainbo Simulations Tape*.)

CoCo Talker
Speaks For Itself

If you have a voice pak then you should not be without *CoCo Talker* from Computerware. No matter what brand your voice pak, Computerware probably has a version that is compatible. The version I will be reviewing is for the Radio Shack *Speech-Pak.*

CoCo Talker comes in an attractive package with an 11-page manual. The first page gives warranty information and requests that you not pirate Computerware's software. The other 10 pages contain complete instructions as well as programming examples.

The disk I received contained seven files. These included a text-to-speech translator, an exceptions dictionary for the translator, a manager which allows the user to alter the dictionary, and a "Talking Head" program. To get into the translator, you simply type `RUN "SPEAK"`. You are greeted with a menu which allows you to enter text and have it spoken.

One note here: Although this program worked flawlessly, the instructions gave no information on how to use phonemes. Computerware also neglected to include a list of phonemes in the package. This is a major drawback since phonemes are required to edit the dictionary.

Another option which the translator allows is s
echo. After choosing this option, you may return to B
and from there each alphanumeric character that is pr
on the screen will also be spoken. Simple keystrokes
you to toggle this mode on and off and also switch bet
word and letter echo. In my opinion, this is wher
software shines!

Even if you don't use the echo, the translator may
be used with simple `USR(X)` functions. The trans
includes a dictionary of exceptions which it checks b
speaking each word. If it finds the word to be spok
the dictionary, it will use the predefined phonemes to s
the word. If not, it uses a standard phonetic algor
for the voice. I found the translator did an excellen
and rarely did I find it necessary to intentionally mis
a word for better pronunciation.

The Talking Head program is, of course, the mos
of all of the programs. It is actually just the trans
attached to the graphics subroutine which makes a
Res graphics head's mouth move as the computer sp
Although it is very entertaining, I can think of no pra
uses for it. Note here that you must have a disk sy
for the Talking Head program. All of the other soft
works with cassette.

Overall, I would highly recommend *CoCo Talk*
anyone who has a voice pak. I congratulate Computer
and Frank Delargy for an excellent utility, but I feel
package does have one major flaw. If you don't know
about the use of phonemes in voice synthesis, that
of the software will be completely useless to you bec
the instructions are very sketchy in that area. Further
you will be unable to alter the dictionary as it also
phonetic input. (This is not a software flaw — everyt
worked fine — this is merely a lack of documentation w
I am sure will be remedied.) Even with this drawb
CoCo Talker is an excellent addition to anyone's soft
library.

(Computerware, P.O. Box 668, 4403 Manchester Avenu
Suite 102, Encinitas, CA 92024, tape $21.95, disk $24.95)

— Rick R

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One-Liner Contest Winner . . .

This one-liner is for disk clean-up time. When
disk is full of useless files, instead of typing the `KIL`
command over and over, use *Killprog.*

The listing:

```
0 CLS0:PRINT" HIT @ THEN ENTER
OR DIRECTORY":PRINT@67," HIT /
HEN ENTER TO END ";:PRINT@224,"
ROGRAM NAME/EXT: ";:LINEINPUTA$
PRINT@485," ANY KEY TO CONTINUE
";:IFA$="/"THENCLS:ENDELSEIFA$=
@"THENDIR:EXEC44539:GOTO0ELSEKI
LA$:EXEC44539:GOTO0
```

Bob Kult
Marshfield, W

(For this winning one-liner contest entry, the author has been sent copi
of both *The Rainbow Book Of Simulations* and its companion *Rainbo*
Simulations Tape.)

CDITS Does Inventory For Your Disk Files

urora Computing Disk Information and Transfer stem, or *ACDITS*, will assist you in organizing your k files and transferring disk to tape and tape to disk. e program (actually two programs on the system disk) uires a minimum of 32K and a disk drive.

CDITS works flawlessly in performing the three ctions described:

) The creation of a disk information file on each disk in your library that contains detailed information about that disk. This file can be output to the printer or screen. Labels can be printed for each disk jacket.
) A catalog can be created of all your disk files. An entire catalog can be output to the screen or printer. While working with a catalog file you can search, delete or append.
) Transferring files from tape to disk or disk to tape. In the tape to disk mode you can either transfer an entire tape to disk or transfer a single file. In the disk to tape mode only one file can be transferred at a time.

n order to make a disk information file for a disk it ist have at least one free granule. You will be asked input a date (up to 12 characters), a disk ID number ro to 255) and a disk name. The computer will then d the directory and write a file to the disk.

nformation about a particular disk can be printed to ner the screen or printer. The information printed ludes the filename/extension, the start, end and EXEC dresses of machine code programs, the disk ID and the mber of granules the file uses, all sorted by filename. your output is to screen you can use the arrow keys scroll through the information. For files sent to the nter you are asked for an appropriate Baud rate (300,), 1200 or 2400).

n creating a catalog mode you can create one big catalog all your disks or a catalog for each category of disks it you have, i.e., utilities, Adventures, games, etc. Each alog file will contain the same information about each as the Disk Information File mentioned above.

catalog can be output to the screen or printer. When tput is sent to the printer the computer will automatically ge files after each 50 have been printed. It will not number pages, though; this would have been nice.

The Search function will tell you which disk(s) a rticular file is on. You will be provided the same ormation mentioned in the Disk Information File. The arch function works fine but you are required to type the entire filename, including extension. It would have en nice if you were allowed to type in part of a filename. dividual Disk Information Files can be appended to a alog file at any time.

You are given two options for deletion of information. u can delete an individual file from a catalog or, if you sh, you can delete an entire disk from a catalog. In this ond mode all files will be deleted that have the disk mber entered.

Attractive labels can be made for your disk jackets. The files are printed out three across in vertical, alphabetical order. At the top of the label the number of free granules remaining on the disk and the disk ID number are printed as a title.

The Tape to Disk option will allow you to either transfer all files on a tape automatically to disk or you can be selective and make a decision as each file is loaded in from tape. This portion of *ACDITS* is a separate program and can be used by itself if you wish. You are limited to transferring files of no more than 24K.

The Disk to Tape option allows transfer of files included in a Disk Information File to be transferred to tape. It is not a stand-alone program and files must be included in *ACDITS* file before they can be transferred.

ACDITS is a relatively easy program to use and seems to be designed so you won't easily lose data. Most of the time it is user friendly, but there are some areas where this could be improved. As mentioned earlier, when entering filenames you must use a backslash (\) between the filename and extension. If you try to enter a filename using a period (.) *ACDITS* will not accept it. This proves to be quite irritating if you are used to using the period. Another area that could be improved is the Search function. To search for a file you have to type it in exactly as it appears in a catalog. It would have been nice if you could just type part of a filename and search for all occurrences of that particular string. One other thing that would be nice is for automatic page numbering on printouts of more than one page.

That's enough criticisms. All in all, *ACDITS* is a good program for disk file cataloging. I have two other similar programs that have some nicer features but they don't have the file transfer capabilities that *ACDITS* does. *ACDITS* comes on disk with eight pages of documentation. If you're looking for a program that does the things I mentioned above, then this is a reasonably priced program to take care of those needs.

(Aurora Computing, 49 Brookland Ave., Ontario, Canada L4G 2H6, disk $19.95)

— Michael Hunt

One-Liner Contest Winner . . .

This program uses the CoCo's fast screen printing capability to create optical illusions with your own name (or any string).

The listing:

```
1 P$="T255BA#AG#GFFEE-DC#C":CLS4
:INPUT"NAME";A$:CLS3:FORN=1TO2:P
LAY"O5BP255":NEXT:PLAY"O4"+P$+"O
3"+P$:FORN=1TOLEN(A$):PRINTMID$(
A$,N,1);:PLAY"O2P1"+P$+P$:NEXT:F
ORN=1TO99:PLAY"V31O2BB":B$=B$+"
":FORM=1TO250:PLAY"V8O5B":PRINTA
$+B$;:NEXTM,N
```

Steve Sward
Bellevue, NE

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

VIEW-EDIT: A Dynamic pproach To Image Processing

By Dan Downard

ecently, a review appeared in THE RAINBOW (June 1985, ; 197) for *VIEW-II* and CoCoGrey, a complete SSTV sceiver for the CoCo. SoftCircuits has introduced a if image processing programs called *VIEW-EDIT* that e this combination hard to beat for 8.5-second slow .

IEW-EDIT requires a disk-based 64K CoCo and one tick. Disk BASIC is recommended, but ADOS will work ell. It is not necessary to have the CoCoGrey medium lution adapter, but I would highly recommend its use. : CoCoGrey is a hardware modification that gives you ;ray levels with 128-by-192 resolution.) The software es non-protected, so you can make as many copies ou wish for your own use. The documentation consists n attractive 16-page booklet that is above average in aining the functions of the program.

he best way to describe *VIEW-EDIT* is to point out e of the high points of the program. It is truly an ge processing system, not just another graphics ;ram.

IEW-EDIT pictures are stored in an 8K format with ı byte representing two pixels on the screen. Two 128-by-128 screens are available for editing; these screens are called buffers. At any time during the editing process a 16-level gray scale can be called by positioning the cursor at the bottom-left of the screen. With this feature the current gray level for the cursor can be changed at will.

The menu is joystick driven by positioning the cursor next to the function desired. Depressing the firebutton activates that particular function. A Help function is available in case you need to refresh your memory on the function in question.

Define is the heart of any function selection. Define allows the selection of the area of the image you wish to process. After you Define the area, you can either use it as a Stamp or a Window. A Stamp, as in many other graphics programs, allows the duplication of the defined area to another portion of the image. The Window mode allows processing on a restricted part of the image. Of course, you can Define the entire image as the Window and perform functions on the whole working buffer.

An Undo function allows the cancellation of the previous operation. This is really nice for making changes if things didn't work out the way you planned.

A multitude of functions can be performed on the Stamp buffer. It can be flipped horizontally or vertically, rotated, shrunk, expanded, inverted, blanked or filled with one of 16 gray levels. These features allow the generation of tremendous graphics designs from scratch.

The whole scheme of operation amounts to defining your stamp using a rubber band rectangle. This same rubber band technique is used to place the stamp at any position on the screen. Hence, there are actually no shrink and

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expand functions, as these features are automatic. A status line is included at the bottom of the screen for maintaining the correct aspect ratio of the Stamp image.

A Text function allows the generation of up to nine characters at a time. Characters are placed on the screen with the same rubber band method as in graphics editing. This is one of the weak points of the program, as only coarse block lettering is available. At the same time, this type of lettering is common for slow scan transmissions due to the need for contrast.

Fatbits allows individual pixel editing by expanding the screen so each pixel can be set to a distinct gray level. A picture could be created by this method, but it is very tedious to say the least.

Lines and circles can be generated using rubber band techniques with the joystick. As in all other features, the function in question is generated in any one of 16 gray levels using the drop-down pallette of colors, or gray levels.

The features that really distinguish *VIEW-EDIT* from other graphics programs are the image processing functions. One has already been mentioned, Invert. A pixel-by-pixel, gray-scale inversion can be performed on the Stamp buffer, giving you a video negative.

In addition, several filters are available, including low pass, high pass, notch and peak. A histogram of the image can be generated at any time. The results of these filters are unique for their intended purpose, or just to create some very interesting effects. The filter commands require some experimentation, but make the whole program worthwhile.

One feature that is outstanding is Scan Edit. It is normal to have misplaced scans during any slow scan transmission. Using Scan Edit, any horizontal scan can be isolated and moved to align it with the rest of the picture. This is the first time I have ever seen this feature in a program, and it is invaluable for the slow scan enthusiast.

Brightness and contrast of the digital image can be adjusted by two additional functions. First, a histogram displays the current level, then you are allowed to alter it as you wish.

As *VIEW-EDIT* is a disk-based software package, standard disk commands are included such as `SAVE`, `LOAD`, `KILL`, `DIR` and `QUIT`. The default drive can be changed using the New Drive command. One drive is necessary for the software, but the remaining space is just adequate for storage of a few pictures. Two drives make life a little easier.

All of the pictures are given an extension of "PIX." When any disk command is encountered, a menu appears of the pictures on the default drive. The picture is selected by placing the cursor next to the name. The PIX extension is omitted on all menus.

If you already have the *VIEW-II* software, a program is included to merge all of the necessary programs onto one master disk.

I think *VIEW-EDIT* is a dynamic approach to image processing with a small personal computer. Those who enjoy this type of activity, for ham radio or for any other similar hobby, should consider this package a necessary addition to their software library.

(SoftCircuits, Inc., 401 S.W. 75th Terrace, North Lauderdale, FL 33068, disk $24.95)

Software Review

For Masochistic Madness Play *Warehouse Mutants*

While playing *Warehouse Mutants*, I found it diff to imagine being a warehouse caretaker fighting off de intruders. But it doesn't take a lot of imagination to e playing the game. As a matter of fact, the fast pac *Warehouse Mutants* does not allow its players a lc time to think about anything but survival.

The game is very arcade-like with its excellent grap and movement. It begins with you in the middle of a r of square crates, more like blocks, and a mutant in of the four corners of the screen. The object is to kil of the invaders before they get to you. They move tov you swiftly and the only way to destroy them is to sn crates against them. And, as if the first four mutants a enough to deal with, there are eight more at ran locations waiting to break out of their crates and a in the chase. Fortunately though, the flashing, cr invaders can be destroyed before they break out by pus their crates into a wall or zapping them with the firebut But, before you know it, if you survive long enough, will be confronted by a warehouse full of mutants.

To survive the game, each of the destructive creat must be zapped before the player gets hit four times s four hits ends the game. The difficulty comes in fin time to strategize a plan for killing the mutants w constantly avoiding them. The most success I had invo first killing off a few of the creatures, then moving s crates around to form a blocked off area. Stopping blocked off area can drive several mutants into a swir madness long enough for you to map out more strat Also, getting a lot of them into a concentrated area be good since the 50 points awarded for killing one mu is doubled for each additional one killed with the s block. Therefore, if you kill three mutants in a row, will get 50 + 100 + 200 = 350 points. Killing eight mut with one crate is worth 6,400 points, which would b honorable total game score itself.

If you are able to kill all of the mutants in a scr you move on to a faster and harder screen. Whatever you have left are kept and a bonus hit is earned e time you get through a screen without getting hit. game also includes a pause feature by hitting the CL key. Pressing the SHIFT and '?' keys simultaneously allow you to skip any screen if pressed when the sc is just starting.

Although I achieved much more frustration t gratification from playing *Warehouse Mutants*, I still fo myself wanting to play continuously. Something about pesty mutants, which more often than not got the of me, seemed to bring out a masochistic streak! Need to say, it usually proved futile as I was tortured time a time.

(Tom Mix Software, 4825 Bradford N.E., Grand Rapids MI 49506, 16K tape $24.95, 16K disk $27.95)

— Philip S. H

Count To 100 Provides Preschool Fun With Math

ount To 100 is designed for preschool, kindergarten first grade level children. It can be used to reinforce h concepts for up to third grade remedial level. It is ienu-driven program that requires a minimum of stance once the program is loaded.

selection of control features eases the operation of program by allowing a one-key selection of: Returning ie menu, Voice on/off, Upper range limit, Help function Pause option.

'ount To 100 is useful in sequential counting, counting wos (even or odd numbers), counting by fives or 10s, counting backwards, if you so desire. All but the nting backwards option are supported by manual input flashcard modes. The flashcard mode allows you to nt along with your CoCo, while the manual mode iires that you key in the next number.

he voice option of the program is guaranteed to work i *The Voice* speech synthesizer; other synthesizers may k but are not guaranteed to perform.

/e tested the *Count To 100* with our preschooler, who turned five, our kindergarten superstar, who just turned and our second grader who doesn't care about anything ɜss it eats hay and wears a saddle. The only problem encountered was finding enough time to let "ol' Dad" ew this package. The flashcard mode provided an resting competitive game, and the pause control feature e more than sufficient help and a chance to gather your ie when things get out of control.

he tape version we had loaded several times with no of any problems. The documentation provided was ct and very adequate with specifics and examples ilable if needed.

he package is obviously well thought out and provides iecessary functions for a useful math learning tool. For price, the quality and interest that it generated in math ctice and learning, it could be said that "You can count t!"

CY-BURNET-ICS, 5705 Chesswood Dr., Knoxville, TN 7912, tape $29.95 or 34.95 with voice, disk $32.95 or 37.95 vith voice)

— Tony Compton

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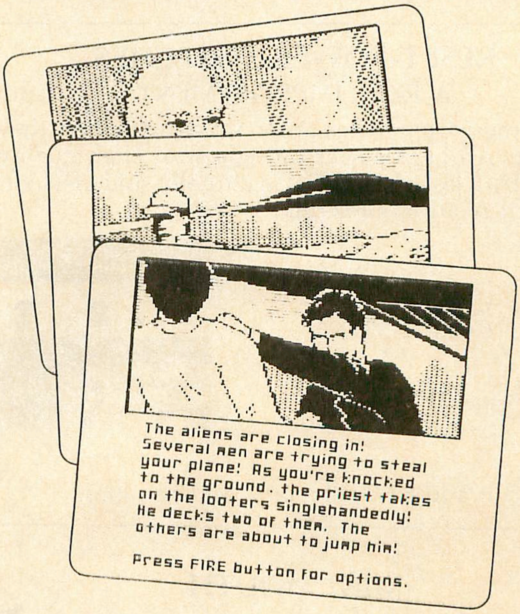

```
The aliens are closing in!
Several men are trying to steal
your plane! As you're knocked
to the ground. the priest takes
on the looters singlehandedly!
He decks two of them. The
others are about to jump him!

Press FIRE button for options.
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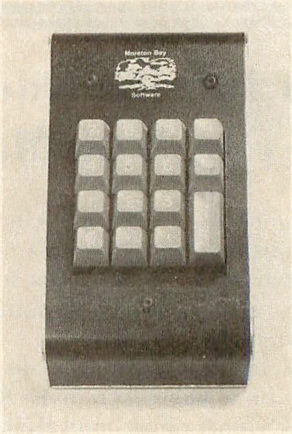

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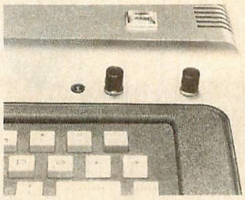

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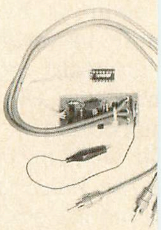

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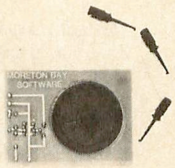
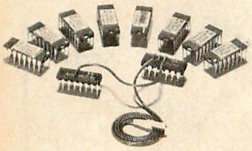


64K UPGRADES



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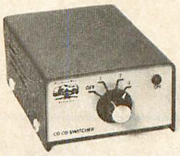

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CORRECTIONS

"Play Your Favorite Games With No Wires Attached" (June 1985, Page 105): Jim Shaver tells us there are a few errors in the schematic diagrams, and that the parts list was left out. Here is the parts list, with Radio Shack catalog numbers in parentheses:

C1-C3	0.1 mf (272-135)
IC1, IC3	74LS240 octal buffer
IC2	7402 quad NAND gate
IC4, IC5	4066 CMOS quad bilateral switch (276-2466)
IC6	4011 CMOS quad 2-input NAND gate (276-2411)
IC7	7805 voltage regulator (276-1770)
J1, J2	9-pin D-sub connector plug (276-1537)
J3	⅛" miniature phone jack (274-251)
LED1-LED10	T-1¾ red LED (276-041)
P1, P2	Joystick plug with cable (AW-2894; order from Radio Shack National Parts)
R1-R10	10K ¼ watt (271-1335)
R11-R20	1K ¼ watt (271-1321)
R21-R38	47K ¼ watt (271-1342)
R39, R40	1 megohm ¼ watt (271-1356)
SW1-SW3	SPST toggle (275-624)

The 74LS240 and 7402 chips are not available from Radio Shack, but can be had from industrial electronic distributors in major cities.

In addition, these corrections apply to the schematic diagrams on pages 106 and 108:

1) In Figure 1, pins 6 and 8 are reversed.

2) In Figure 2B, the three leads of IC4 going to ground should be marked '3,' '7' and '9.' In addition, the chip at the bottom of the page should be marked IC5; pins 1, 11 and 14 go to +5 volts.

3) In Figure 3, the upper chip should be labeled as a 74LS240 instead of 74L5240.

"Super Disk Charger" (June 1985, Page 113): Dennis Bironas tells us that a line should be added in Listing 2 as follows:

```
00105     NOP
```

Also, the `POKE`s in the yellow box at the top of Page 116 apply to Version 1.0 or Disk BASIC. If you have Disk BASIC 1.1, use these `POKE`s instead:

```
POKE &HD29D,40:POKE &HD65F,40:POKE &HD682,4

POKE &HD44C,78:POKE &HC735,78:POKE &HC7BB,7

POKE &HC7D0,78:POKE &HC7EF,78:POKE &HCD26,4

POKE &HCEB5,78:POKE &HD534,39:POKE &HC75A,1
```

"Geo-Graphics" (September 1984, Page 177): Joseph Paravati advises us that, although the listing in the magaz is correct, many users have reported they get an ?FC Er in Line 5120 due to an incorrectly typed `DATA` statem He suggests the following procedure to find the error:

— Enter `PRINT A$` immediately after the error occu This will show the letter or numeral the error is cau by. Check the `DATA` line containing that letter.

— If more than one character appears, enter `PRINT` Count that number of characters over, and that charac is the one at fault.

"MAIL09 (June 1985, Page 249): Please refer to P 246 of *this* issue for the remainder of the listings wh were inadvertently left out of this OS-9 feature.

One-Liner Contest Winner . . .

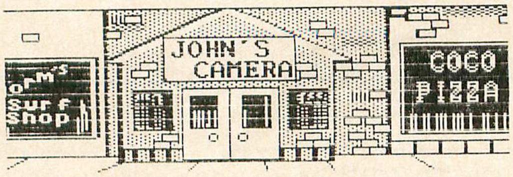
This one-liner isn't your ordinary shoot-'em-up game. *Cannon* shows a cannon and target on the screen, then asks for an elevation angle. The object is to find the correct angle to hit the target in as few tries as possible.

The listing:

```
0 PMODE3:PCLS:N=190:R=RND(150)+5
0:LINE(R,182)-(R+8,N),PSET,B:CIR
CLE(8,N),5:SCREEN1:PLAY"P1":FORS
=1TO5:INPUT"EL";E:SCREEN1:FORT=1
TO99:X=6*T*COS(E/57):Y=(6*SIN(E/
57)-.08*T)*T:PSET(X+8,N-Y):IFY<0
THENNEXTS ELSEIFR-8<X ANDX<R AND
Y<7THENPRINT"hit"ELSENEXT
```

J.D. German
Cedar Crest, NM

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)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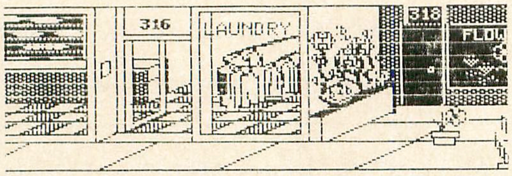
316
LAUNDRY
318
FLO

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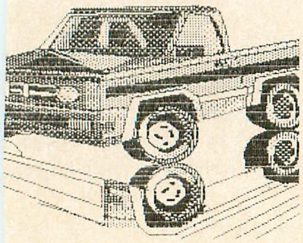

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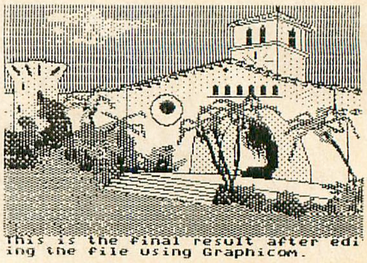
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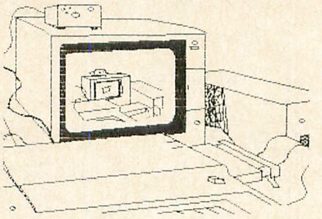

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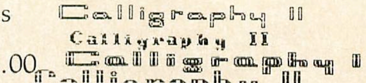
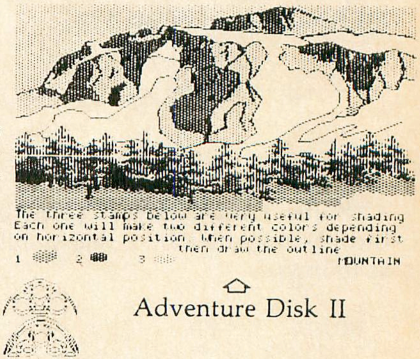

Calligraphy II
Calligraphy II
Calligraphy II
Calligraphy II
Calligraphy II calligraphy I
CALLIGRAPHY II

Calligraphy Disk II: 23
New letter stamp sets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then draw the outline
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2
3
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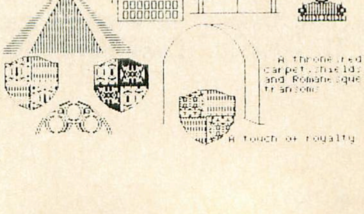
A throne, red
carpet, shields
and Romanesque
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RAINBOW Info

How To Read Rainbow

ease note that all the BASIC program ngs you will find in THE RAINBOW are natted for a 32-character screen — hey will show up just as they do on CoCo screen. One easy way to ck on the accuracy of your typing compare what character "goes r" what. If the characters match — your line endings come out the e — you have a pretty good way of ving that your typing is accurate.

e also have "key boxes" to show you *minimum* system a program needs. *do* read the text before you start ng.

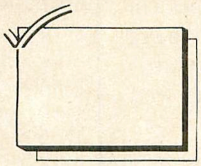
nally, the little cassette symbol on ngs indicates that program is availa- hrough our RAINBOW ON TAPE service. order form for this service is on the rt card bound in the magazine.

What's A CoCo

Co is an affectionate name which first given to the TRS-80 Color nputer by its many fans, users and ers.

owever, when we use the term o, we refer to both the TRS-80 Color nputer and the TDP System-100 nputer. It is easier than using both ne "given" names throughout THE BOW.

he Rainbow Check Plus



ne small boxes that you see accom- ying programs in THE RAINBOW is a ck sum" system, which is designed elp you type in programs accurately. *ainbow Check PLUS* will count the ber and values of characters you in. You can then compare the ber you get to those printed in THE BOW. On longer programs, some chmark lines are given. When you h the end of one of those lines with typing, simply check to see if the bers match.

To use *Rainbow Check PLUS,* type in the program and CSAVE it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down-arrow key, your CoCo will give you the checksum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure that you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine Language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so that you can operate them.

The easiest way is by using an editor/ assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into your CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW'S listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand assemble some programs.

Use the following program if you wish to hand assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of 'I' to &H7F80.

The Rainbow Seal

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The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product which carries the Seal has been physically seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

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There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

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JOYSTICK UTILITY

16K
ECB

With a little aircraft technology, you can be in complete control . . .

The Joystick Fix-It

By John G. Williams

This program is a solution to a problem which plagues users of the standard Radio Shack joysticks. We all know the sticks are inexpensive and work well enough for most applications. However, they seem to be too sensitive near the center so it is easy to over-control screen objects.

Since I am an engineer on the F-16 fighter program, I'm aware of a method used in its flight control computer to cure that same problem in the aircraft. The pilot commands are received by the computer and shaped by a series of equations to provide the desired airplane motion.

The CoCo can do the same thing for us. All it takes is for the stick command to be multiplied by the absolute value of itself and divided by a constant to retain proper scaling. The stick will then have a slower response near center, but will still have quick action near the extremes.

Stik Fix is a demonstration of this capability. RUN the program and slowly move the right stick laterally to see the effect. The screen horizontal axis is the stick motion while the vertical axis is the modified command. (I have put this change into the *Sopwith CoCo* flight simulator roll control, and it makes the action much smoother and easier to manage.)

The listing:

```
10 PMODE4,1:SCREEN1,1:PCLS(5):CO
LOR0,5
15 LINE(128,0)-(128,191),PSET:LI
NE(0,96)-(255,96),PSET
20 X=3.2*(JOYSTK(0)-31.5)
30 Y=(ABS(X)*X)/130
40 PSET(128+X,96.5-Y)
50 GOTO20
```

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disk but WHY BUY A DISK AT ALL?

n-DISK should be in the library of every
rious CoCo user even if you own a disk
ys Frank J. Esser, independent reviewer
r RAINBOW Magazine!

OK sure, disk drives ARE NICE. I own one. But if your finances are limited, the Un-DISK can give you much of the power of the mechanical drive. Even if you already own a disk the Un-DISK can work like a super fast extra disk.

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Watch out for dog bytes! This canine version of the carnie's classic shell game is a fascinating test of your visual reflexes

Which Way Did Tha Mangy Mongrel Go?

By Brad Nation

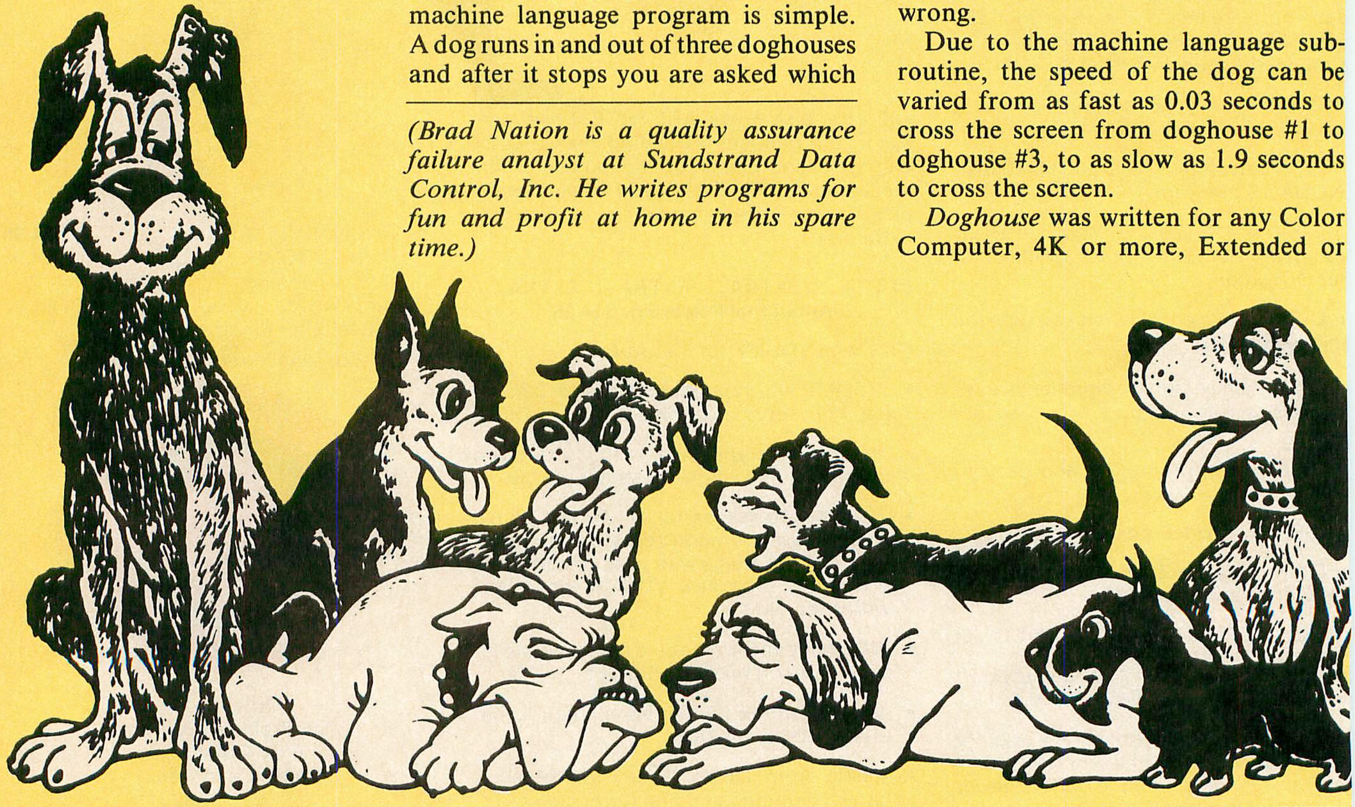
Doghouse is a short program to challenge the visual reflexes of everyone from toddlers to adults. The 2,087-byte Color BASIC and machine language program is simple. A dog runs in and out of three doghouses and after it stops you are asked which house you think he is in. After each response the dog's speed is adjusted by approximately 30 percent, faster if your answer was right and slower if it was wrong.

Due to the machine language subroutine, the speed of the dog can be varied from as fast as 0.03 seconds to cross the screen from doghouse #1 to doghouse #3, to as slow as 1.9 seconds to cross the screen.

Doghouse was written for any Color Computer, 4K or more, Extended or

---

(Brad Nation is a quality assurance failure analyst at Sundstrand Data Control, Inc. He writes programs for fun and profit at home in his spare time.)



Extended BASIC. Please note,
ver, that users with Color BASIC
d replace Line 2 with 2 POKE
ML/256:POKE 276,ML-PEEK
)*256. This is because the DEFUSR
and is not supported by Color
, so the machine language routine's
tion address must be poked into
ons 275 and 276. As an alternative,
of either system can replace Line
th 2 IF(PEEK(32768)=69
EEK(32769)=88) THEN DEFUSR=
LSE POKE 275,ML/256:
276, ML-PEEK(275)*256 which
s the program to determine if
ded BASIC is present or not. The
am will then be able to run on
ystem.

The 321-byte machine language routine is position-independent so users with 32K or more may want to put the ML routine into higher memory by changing the CLEAR statement in Line 1 to CLEAR 200,32446, and also the value for ML in Line 1.

Also, 4K BASIC users must change the CLEAR statement to CLEAR 200,3774 and change the value of ML to ML=3775. This is due to the smaller memory size.

Type in *Doghouse* and run the program. Operating instructions are provided on-screen. Pressing 'S' when "PRESS 4 TO GO" is displayed will show the speed the dog will run during the next round (100 = fastest and 0 = slowest).

The assembly listing for the ML routine is not included. The routine operates as follows: On entry to the routine, if the passed parameter is equal to '1' (i.e., A=USR(1)), then the dog has started in doghouse #2 and the doghouse doors are opened. If the passed parameter is '2,' then the doghouse doors are closed so the dog can't be seen; if the passed parameter is '3,' then the doors are opened to show the dog. If the passed parameter is any other value (in Line 7 NP equals 1317, 1327 or 1337), then the dog runs to the new location.

(For those having questions about this program, you may write to Mr. Nation at: 15115 N.E. 8th Street, Bellevue, WA 98007.)

e **listing:** DOGHOUSE

```
CLS3:PRINT@137," doghouse game
;:CLEAR 200,16062:PRINT@448:PR
T:ML=16063
DEFUSR=ML' EXTENDED ONLY
FOR I=ML TO ML+320:READ J:POKE
,J:NEXT I:A=USR(1):R$=" GOOD,
U WERE RIGHT! ":C$=CHR$(175):F
 I=1 TO 5:C$=C$+C$:NEXTI:S=25
PRINT@100,C$;:PRINT@104," PRES
'4' TO GO ";:A$=INKEY$
A$=INKEY$:IF A$="S" THEN PRINT
00,C$;:PRINT@106," speed =";IN
100-S/1.27);:FORI=1TO900:NEXTI
OTO4 ELSEIF A$="4" THEN PRINT@
0,C$;:PRINT@107,"GET READY";:
SE A=RND(6):GOTO 5
FOR I=1034 TO 1449 STEP 32:J=R
(8)*16+127:POKE I,J:POKE I+10,
SOUND(255-(I-1035)/2),1:NEXTI:
KE ML+232,S:POKE ML+234,S:FOR
1034 TO 1449 STEP 32:POKE I,17
POKE I+10,175:NEXTI:PRINT@100,
;:FOR I=1 TO 15+RND(15)
NP=RND(3)*10+1307:IF NP=OP THE
7 ELSE A=USR(NP):OP=NP:NEXT I:
USR(2):PRINT@103," WHERE IS TH
DOG?";:A$=INKEY$
A$=INKEY$:G=VAL(A$):IF G<1 OR
3 THEN 8 ELSE A=USR(3):S=PEEK(
+232):G=G*10+1307:PRINT@100,C$
IF G<>NP THEN 10
PRINT@101,;:FORI=1 TO LEN(R$):
INT MID$(R$,I,1);:IF MID$(R$,I
)=" " THEN FOR J=1 TO 50:NEXTJ
:FORJ=1TO500:NEXTJ:S=S/1.3:GOT
4 ELSE SOUND(10+10*I),1:NEXTI
 PRINT@101," SORRY, YOU WERE W
NG ";:FOR I=1 TO 11:SOUND 50,1
:SOUND 75,1:NEXT I:S=S*1.3+1:IF
S<127 THEN 4 ELSE S=127:GOTO 4
11 DATA 189,179,237,193,1,16,39,
0,30,193,2,39,79,193,3,39,67,237
,141,0,233,236,141,0,227,16,163,
141,0,224,39,119,16,44,0,116,22,
0,147,95,231,141,0,212,142,5,47,
175,141,0,201,175,141,0,199,134,
49,183,4
12 DATA 197,134,50,183,4,207,134
,51,183,4,217,142,4,227,49,141,0
,206,141,46,142,5,1,141,41,230,1
41,0,168,39,105,32,70,51,141,0,2
03,32,4,51,141,0,208,142,5,33,14
1,16,142,5,65,141,11,142,5,97,14
1,6,142
13 DATA 5,129,141,1,57,31,50,166
,160,39,22,167,132,167,137,0,10,
167,137,0,20,48,1,32,238,166,160
,39,4,167,128,32,248,57,198,1,23
1,141,0,98,106,141,0,91,141,190,
174,141,0,84,48,30,49,141,0,83,1
41,68,48
14 DATA 136,30,141,218,48,136,27
,32,29,95,231,141,0,65,108,141,0
,58,141,157,174,141,0,51,49,141,
0,65,141,37,48,136,27,141,187,48
,136,28,16,142,202,202,16,175,13
2,48,3,16,142,197,197,16,175,132
15 DATA 134,25,198,25,90,44,253,
74,44,248,22,255,33,141,153,48,1
36,29,141,148,57,5,57,5,57,0,204
,198,198,0,195,194,193,0,128,128
,128,193,0,201,201,204,0,194,193
,195,0,194,128,128,128,0,172,168
,179,164,172,0,168
16 DATA 179,183,191,191,191,187,
179,164,0,191,255,255,255,255,25
5,255,255,191,175,0,191,207,207,
207,207,207,207,207,191,175,0
```

HEALTH EDUCATION

16K ECB

This practical application gives a simple test of your eyesight to indicate if there's a need to seek professional examination

As Far As The Eye Can See

By Robert L. Gr

Many of us take our precious gift of sight for granted, but misuse, pollution and disease can slowly rob us of our good vision. I'm just a country programmer, but my CoCo can now make my family and friends more alert to vision dangers and seek regular checkups with a doctor of optometry or an ophthamologist.

Vision is the eye-opening program that turns our computer into a health advocate. The first test is for retinal disparity and focus. This "parlor trick" test serves to grab our attention in preparation for the red/green colorblind test. The red/green syndrome is usually a male trait, but that distinction is necessary for traffic signals, other light indicators and for electronic component coding.

For the beginning programmer, *Vision* serves to clearly demonstrate both special CoCo features and some sophisticated techniques. It also provides that person with a free alphabet (lines 290-560).

Line 20 dimensions the 'A' array for a `GET` and `PUT` function later in the program, and also makes ST$ equal 32 graphics characters to enhance and make more professional the set of instructions (lines 580-690).

> ***"Vision is the eye-opening program that turns our computer into a health advocate . . . For the beginning programmer, it serves to clearly demonstrate both special CoCo features and some sophisticated techniques."***

Line 130 sets up the three views of the three colored circles. Line 70 determines the length of time the circles remain on the screen. Line 160 determines the length of time the screen is cleared (`PCLS`).

The colorblind test begins wit 170. Using `PSET` to color in m the screen took so long I feared m takers would fall asleep.

Lines 170-180 use loops to ran place colored dots at the upp corner of the screen in a 20-by-2 Line 190 `GET`s the area in the 'A' and stores it for later use.

Line 200 uses loops to replica `SET` 'A' array, thus drawing the much faster with no big loss to ra coloring.

In Line 30 is the first of the commands using the alphabet 290-560). This technique saves l typing and errors.

Another timesaver is the `I` (Line 270 for the colorblind te Line 710 for the instructions). allow quick keyboard one-stroke ation and using the feature as a routine permits faster typing program.

`SOUND` is used in Line 250 me a prompt to alert the user th computer is ready with another c circle to be discerned.

Vision adds a very practica rewarding aspect to the CoCo. It s prompt others to contribute pro that can benefit the family an population in general.

(Robert Green is former president of the TRS-80 Users Group of Atlanta, Ltd., and was selected by Johns Hopkins and Tandy to host the Southeast's first computer-assisted aid to the handicapped workshop and fair. He writes, teaches and does consulting work.)

```
190 ......161
410 .......75
600 .......12
670 .......22
END ......99
```

listing: VISION

```
0 '******** VISION ********
1 '** COPYRIGHT (C) 1984 **
2 '** BY ROBERT L. GREEN **
3 '** POST OFFICE BOX 419**
4 '** CLARKSTON, GA 30021**
5 '** PH: (404) 451-9813 **
6 '************************
10 CLEAR1000
20 DIMA(20,20):ST$=STRING$(32,CH
R$(150))
30 CLS:PRINTST$:GOSUB580
40 PMODE1,1:SCREEN4,1:PCLS:GOSUB
290
50 FORT=1TO3
60 CIRCLE(100,100),60,3
70 FORX=1TO500:NEXT
80 PAINT(105,120),3,3
90 CIRCLE(100,100),30,4
100 PAINT(100,100),4,4
110 CIRCLE(100,100),10,3
120 PAINT(100,100),3,3
130 FORX=1TO3000:NEXT
140 PCLS
150 NEXTT
160 FORX=1TO500:NEXT
170 FORX=0TO21:FORY=0TO21:PSET(X
,Y,RND(9)-1)
180 NEXTY:NEXTX
190 GET(0,0)-(20,20),A
200 FORX=19TO150STEP20:FORY=19TO
150STEP20
210 PUT(X-19,Y-19)-(X,Y),A:NEXT:
NEXT
230 DRAW"S12;C2;A2;BM170,10;"+C$
+O$+L$+O$+R$:DRAW"S12;C4;A2;BM20
0,30;"+O$+F$:DRAW"S12;C3;A2;BM16
5,50;"+C$+I$+R$+C$+L$+E$
240 FORT=1TO2000:NEXT:DRAW"S12;C
4;A2;BM8,150;"+H$+I$+T$+SP$+K$+E
$+Y$
250 FORX=0TO8:SOUND2*(X+1),2:CIR
CLE(80,80),50,X:GOSUB270:FORW=1T
O10:CIRCLE(10,10),W,X:NEXTW:NEXT
X
260 CLS:PRINT"THE END":END
270 I$=INKEY$:IFI$=""THEN270ELSE
RETURN
290 A$="BEHUNU2R4NU2DGL2BGBL6"
300 B$="BEHENR3HER3D4L3BGBL6"
310 C$="BU4ER2FD2GL2HBG2BL4"
320 D$="BEHU2ER3D4L3BGBL6"
330 E$="BER3U2NL2U2L4BG5BL2"
340 F$="BUR4U2NL3U2BG5BL5"
350 G$="BUR4U3HL2GDRBG3BL4"
360 H$="BUU2NU2R4NU2D2BGBL9"
370 I$="BR2BUU4BU2BD7BL8"
380 J$="BUU3ER2FDBG3BL7"
390 K$="BUE2NH2R2ND2U2BG5BL5"
400 L$="BU5R4D4BGBL9"
410 M$="BUNU4E2F2U4BG5BL5"
420 N$="BUU4F4U4BG5BL5"
430 O$="BEHU2ER2FD2GL2BGBL6"
440 P$="BER3U2NU2L3GNFBG2BL4"
450 Q$="BEHU2ERNDNURFD2GL2BGBL6"
460 R$="BEHERNH2R2NU2D2L3BGBL6"
470 S$="BU2FR2EHL2HER2FBG4BL6"
480 T$="BUR2NU4R2BDBL10"
490 U$="BUU3ER2FD3BGBL9"
500 V$="BUU2E2F2D2BGBL9"
510 W$="BUU4F2E2D4BGBL9"
520 X$="BUE2NH2NE2F2BGBL9"
530 Y$="BUE2NU2F2BGBL9"
540 Z$="BUNR4E4L4BG4BDBL2"
550 SP$="BE4BUBG5BL5"' ***SPACER
560 RETURN
580 PRINTTAB(10)"v i s i o n":PR
US, & RED/GREEN COLOR BLINDNESS.
":PRINT" THOUGH AN OPHTHALMOLOGI
ST OR ODSHOULD ALWAYS BE CONSULT
ED, YOURCOCO MAY BE AN INEXPENSI
VE TEST."
590 GOSUB700
600 PRINTTAB(8)"retinal disparit
y":PRINT:PRINT"  WHEN WE FOCUS O
N SOMETHING, WERETAIN THAT IMAGE
 EVEN AFTER WE STOP LOOKING AT I
```

One-Liner Contest Winner . . .

This one-liner prints a small checkerboard on the Radio Shack DMP-100, Line Printer VII, Line Printer VIII and some other Tandy printers.

To print a full-size (8-by-8-inch) checkerboard, change `FOR H=1 TO 1` to `TO 9` in two places and `FOR J=1 TO 7` to `TO 60` in four places.

The listing:

```
1 PRINT#-2,CHR$(18):FORG=1TO4:FO
RH=1TO1:FORI=1TO4:FORJ=1TO7:PRIN
T#-2,CHR$(128);:NEXT:FORJ=1TO7:P
RINT#-2,CHR$(255);:NEXTJ,I:PRINT
#-2:NEXT:FORH=1TO1:FORI=1TO4:FOR
J=1TO7:PRINT#-2,CHR$(255);:NEXT:
FORJ=1TO7:PRINT#-2,CHR$(128);:NE
XTJ,I:PRINT#-2:NEXTH,G
```

James Britlain
Liverpool, NY

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

```
INT:PRINT" THIS PROGRAM QUICKLY
TESTS FOR:RETINAL DISPARITY, FOC
T.":PRINT:PRINT"  HOWEVER, THAT
IMAGE NOT ONLY  REMAINS ON OUR E
YE'S RETINA, BUTTHE COLORS BECOM
E OPPOSITE!";
610 GOSUB700:PRINT"  OUR FIRST T
EST WILL BE THREE  CIRCLES.  STA
RE AT THEM.  THEY  WILL DISAPPEA
R AND REAPPEAR TWO MORE TIMES."
620 PRINT"  AFTER EACH DISAPPEAR
ANCE, YOU SHOULD STILL SEE SOMET
HING.  IF NOT, THIS MAY INDICATE
 A CONCERNFOR AN EYE CHECKUP.";:
GOSUB700
630 PRINT"  WHILE LOOKING AT THE
 SECOND & THIRD CIRCLES, YOU MAY
 SEE THE  REVERSED IMAGE APPEAR
AT DIFFER-ENT SPOTS AROUND THE C
IRCLE."
640 PRINT"  AFTER VIEWING THE 3
RED & BLUECIRCLES, CLOSE YOUR EY
ES & OPEN THEM, LOOKING AT A WHI
TE WALL."
641 PRINT"   TRY THIS TEST 3 TIM
ES IF YOU DON'T DO WELL TO COMPE
NSATE FOR THE RANDOM BACKGROUND
COLORS.";:GOSUB700
650 PRINT:PRINT" THIS MAY ALSO
NDICATE NEED FORA VISION CHECK
Y AN OPTOMETRIST";:GOSUB700:PRI
TTAB(8)"color blindness":PRINT
660 PRINT" AFTER THE 3-CIRCLE T
ST, YOU'LLUNDERGO A SERIES TEST
FOR RED/  GREEN COLORBLINDNESS."
:PRINT:PRINT"  A MULTI-COLORED
LOCK WILL BE DRAWN AND A COLORE
 CIRCLE DRAWNWITHIN IT.";:GOSUB7
00
670 PRINT"  YOU SHOULD BE ABLE
O SEE THE CIRCLE AND IDENTIFY TH
E COLORS: GREEN WHITE GREEN BLU
 RED WHITEGREEN BLUE RED";:GOSU
700
680 PRINT"  TO CHANGE THE (HIDDE
N) COLOREDCIRCLE, HIT THE SPACE
BAR.":PRINT:PRINT"  A CIRCLE (I
N THE UPPER LEFT)  WILL GROW TO
INDICATE THE PRO-  PER COLOR OF
THE TEST CIRCLE.":PRINT"     GOOD
 LUCK!";:GOSUB700
690 RETURN
700 PRINT:PRINTST$:PRINT"  >-> H
IT g KEY TO gO ON"
710 I$=INKEY$:IFI$=""THEN710ELSE
CLS:PRINTST$;:RETURN
```

Forget Those Point Spread Blues!

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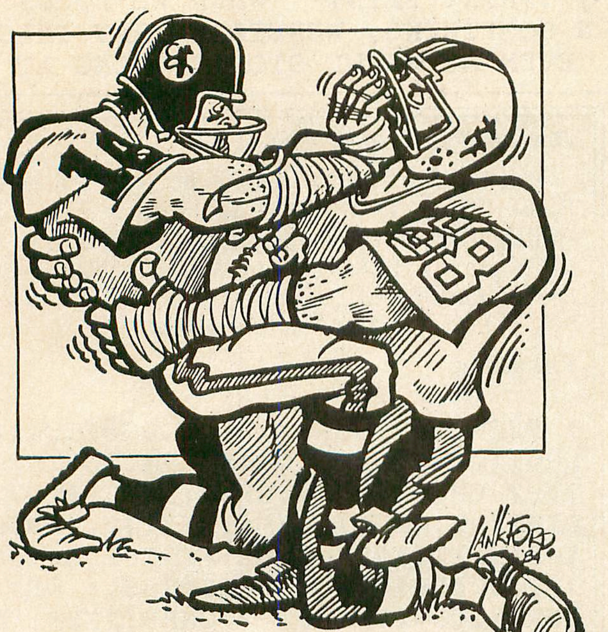

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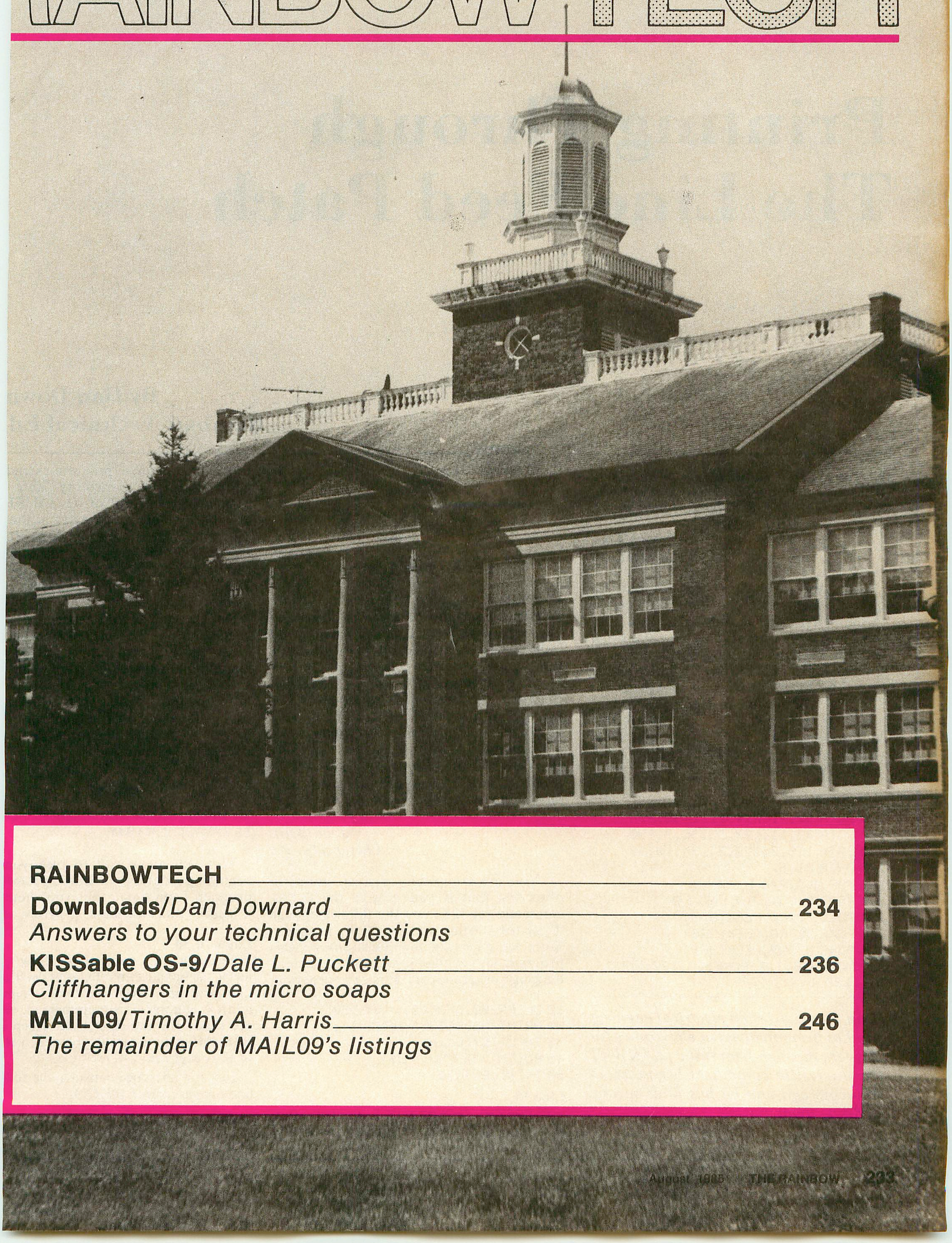
RAINBOWTECH



RAINBOWTECH

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Printing Through The Line Feed Patch

By Dan Down
Rainbow Technical Ed

● *I spoke with you at RAINBOWfest and you said you had a patch to add a line feed to the* BASIC `LIST` *command. I have a 64K CoCo 2 with Disk* BASIC.

John Enders
Marinette, WI

John, we haven't run this program for quite a while, so let's hope it's of some use to the newcomers. It adds a line feed after every carriage return. It also has some other features such as setting your Baud rate. Change 180 in Line 230 to your desired Baud rate. The following version is written for 32K, but will run fine in 16K if you change lines 100, 150, 190, 200 and 210 to 16K addresses by subtracting 16384 from the 32K value. Also, in Line 220, change `POKE 360,127` to `POKE360,63`.

```
100 CLEAR200,32743
110 DATA 52,21,214,111,193,254
120 DATA 38,11,129,13,38,7,190
130 DATA 160,2,173,3,134,10,53
140 DATA 21,57
150 FOR D=32744 TO 32765
160 READ E:POKE D,E:NEXT D
190 POKE 32765,PEEK(359)
200 POKE 32766,PEEK(360)
210 POKE 32767,PEEK(361)
220 POKE359,126:POKE360,127:POKE
361,232
230 POKE150,180
240 END
```

(Dan Downard is an electrical engineer and has been involved in electronics for 25 years through ham radio [K4KWT]. His interest in computers began about six years ago and he has built several 68XX systems.)

Forwarding Address

● *I found* THE RAINBOW *in a bookstore in Portsmouth and bought the April and May issues. In both issues, I found what seems to be a mistake on the "*RAINBOW *Info" page. In the column on "Using Machine Language," if the address is &H7F00 shouldn't I=&H7F80? Then, how do you execute the program? All it does is hang up my machine and I lose everything.*

I have enjoyed your magazine, especially the One-Liners. Also, the reviews of the products and software are excellent. Does anyone have anything more on the DMP-105?

John Burns
Chesapeake, VA

You are completely correct, John, in observing that if you change the `CLEAR` command for 32K, you should also change 'I', or the starting address of the program. Since we receive a few questions on this program, let's explain it to the non-machine language programmers. First, the program:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT"ADDRESS:";HEX$(I);
30 INPUT"BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO20
```

Line 10

`CLEAR200,&H3F00` tells Extended BASIC to reserve 200 bytes for string space and not to let any BASIC program extend address &H3F00 in memory. Since of memory in a 16K CoCo is &H3FF command reserves 256 bytes at the the memory for machine language pro For a 32K/64K computer you can this part of the command to `200,&H7F00`, since &H7FFF is tl memory location.

At the same time there is a statement on the line: I=&H3F80 identifies the beginning address machine language program. This should be changed to correspond lowest address encountered in the ass listing. If you should change this ad be sure to change the corresponding in the `CLEAR` command.

I would suggest deleting Line 1 adding the following:

```
10 INPUT"BEGINNING ADDRESS:";S
15 I=VAL("&H"+S$)
```

This will allow you to pick you beginning address. It won't protect program from BASIC, but you shoul it before you run a BASIC program an

Lines 20-50

These BASIC commands allow y input the hexadecimal bytes at each a one at a time. After the byte is inpu address counter 'I' is incremented, an are ready for the next byte. Keep in the Hex bytes until you reach th of the program.

Just for reference consider the foll line output from *EDTASM+*:

```
7E00 8E 0400 00100 START LDX #$
```

this case, 7E00 is the address of the ning byte of this instruction. 8E,04 and e the bytes at addresses &H7E00, E01 and &H7E02 respectively. If this e first line of the program, you would mething like this:

Change Line 10 of the program to:
`LEAR200,&H7DFF:I=&H7E00`
`UN` the BASIC program
The following will appear on your creen:
ADDRESS: 7E00   BYTE:
You type: `8E (CR)`
You will see:
ADDRESS: 7E01   BYTE:
You type: `04 (CR)`

o on until you reach the end of the .

ng this program
t hit BREAK and you will be back at K prompt. Your machine language am will still be in memory, then you save the program. Use the `(C)SAVEM` nand in the following way:

```
AVEM"name",start addr,end
,execute addr
```

od luck, and I hope this little program nterest you novice ML programmers. h where your programs are located. program will not work for loading in ML programs located below address E00 due to conflicts with BASIC. As as the programs are in upper memory houldn't have any problems.

New, Improved Step Rates Now Faster Than Ever!

hil Cayton of Texas City, Texas, wrote e May 1985 issue how to speed up the rate of your disk drives. Just to add s tip, it is possible to shorten the delay after the controller turns on the motors waits for them to come up to speed.

e DSKCON subroutine calls a delay twice before trying to read or write e disk. This program just eliminates of the calls to the delay routine by ng no operation codes where the first routine is called. First, get into the AM mode with the corrected version ROMRAM *program (*`READA`*, instead* `ADA$`*) from the same May "Downloads" nn. Mr. Clayton's step rate line and of the following lines can be added to rogram for one quick fix. You can also another program from the* Super-RAM *program by adding another line as:*

```
RUN "MYPROG/BAS"
```

educe the wait time on motor start up *DOS 1.0:*

```
X=54937 TO 54939:POKE X,18:
T X
```

For DOS 1.1:

```
FOR X=55180 TO 55182:POKE X,18:
NEXT X
```

Both the step rate increase and the shortened wait time can be added to programs that use the all-RAM mode on their own if they have a BASIC loader that executes the RAM mode. Telewriter-64 *in particular benefits if you create a new line in the program* U/BAS. *Make the new line number 205 and include the step rate and motor wait all on that line. This will make the fixes after it is in the all-RAM mode, before the BASIC loader executes the machine language program. There is a definite improvement.*

Jerome P. Cigna
Rochester, NY

Between you and Phil, we'll have the fastest CoCo disk drives in town, Jerome. Thanks again and keep those tips coming.

You are correct about the *ROMRAM* program in the May column. Let's see if we can get it right this time.

```
10 'ROMRAM 8/85 RAINBOW
20 CLEAR 999
30 DATA 26,80,190,128,0,183,255,
   222,166,128
40 DATA 183,255,223,167,31,140,224,
   0,37,241,57
50 FOR I=1TO21:READA:A$=A$+CHR$(A)
   :NEXT I
60 P=VARPTR(A$)+1
70 POKE P,126
80 EXEC P
90 PRINT"BASIC IS NOW IN RAM"
```

Split-second Question

● *The following is an open letter to the readership sparked by the May issue. "Downloads" had a "how to" donated by Phil Cayton:* POKE*ing to speed disk track to track access time to six milliseconds, however, it was for a 64K machine. Does anyone know what to* POKE *for the same result on a 32K or less machine? I know it can be done since Peter Stark's* Spell N' Fix II *does it.*

James H. DeStafeno
Swedesboro, NJ

The only reason it can be done with *Spell N' Fix II*, Jim, is that this program has a separate DOS on the disk. The constants for track to track access time are in the Disk BASIC ROM and cannot be changed unless you are in the all-RAM mode.

Keyboard to Joystick Conversion

● *I was wondering if it would be possible to alter programs in order to use the joystick instead of the arrow keys?*

Alf C. Dale
Seaforth, Ontario

Alf, you did not mention any specific program, so we will deal in generalities. The ASCII codes for the arrow key on the CoCo are:

Up-arrow	94	$5E
Down-arrow	10	$0A
Left-arrow	8	$08
Right-arrow	9	$09

A BASIC program to detect the right-arrow would look something like:

```
100 A$=INKEY$
110 IF A$=CHR$(9) THEN GOTO . . .
```

To give you an understanding of the `JOYSTK` function, run the following program from the *Getting Started with Color* BASIC manual:

```
10 CLS
20 PRINT@0,JOYSTK(0);'Right-Horiz
30 PRINT@5,JOYSTK(1);'Right-Vert
40 PRINT@10,JOYSTK(2);'Left-Horiz
50 PRINT@15,JOYSTK(3);'Left-Vert
60 GOTO 20
```

Assuming you are using the right joystick, the equivalent program for detecting a right movement of the joystick instead of the right-arrow would be:

```
100 A=JOYSTK(0)
110 IF A>31.5 THEN GOTO . . .
```

The only problem with this procedure is detecting when the joystick is centered, since `JOYSTK` returns an integer. In the above example, change 31.5 to 35 and this should give you a little play in the center.

Making IBM Work for CoCo

● *I have been the proud owner of my CoCo for about two years. Since I must use the IBM PC at school, nowadays I read a lot about changing the Radio Shack DOS ("Cooking with CoCo" by Colin J. Stearman).*

I have been wondering if it is possible to read ASCII files made with an IBM PC and create ASCII files that can be read by the IBM PC so it will be possible to create files with WordStar *at school, then finish these files at home on my own CoCo with* Telewriter. *I have tried it with the Dutch* BASICODE, *but it is a very complicated way to solve this problem.*

Jorgen te Giffel
Haarlem, the Netherlands

Jorgen, we are aware of at least one program that will transfer ASCII files from an IBM PC formatted disk to a CoCo formatted disk. It is available from Mark Data Products. See their ad in this issue (check the "Advertisers Index" on Page 256 for the page number) and write for a catalog.

KISSable OS-9

Cliffhangers In The Micro Soaps

By Dale L. Puc
Rainbow Contributing Ed

Reporting news from the microcomputer software community is a lot like watching prime time television soaps. On *Knots Landing*, Val saw her babies. But, will she get them? On *Dallas*, Bobby died. How will Ewing Oil survive? And on *Dynasty*, half the cast was killed by terrorists in an obscure nation named Mondavia — but, which half?

Come to think of it, Des Moines and Fort Worth are a lot like Mondavia. The cities may not be obscure, but the people there sure like cliffhangers.

"We're working on several interesting projects," said Andy Ball, a marketing representative at Microware Systems Corporation, the Des Moines company that gave birth to OS-9 and licensed it to hundreds of original equipment manufacturers. "We have negotiated some very interesting deals with some large vendors. I think you'll see some very interesting products from Microware and from the OEMs."

What are these "projects"? Unfortunately, we'll have to wait until later this fall to find out — just like on the soaps. However, Ball did offer a few hints.

"Take a look at what is happening to UNIX and you'll find a big hole opening up in the 68000 market," Ball said. "I just returned from a 16 day visit with several major European distributors and the OS-9 68K market th far more mature than in the states. The same is tr Japan. We have licensed hundreds of thousands of co

Why all the interest in OS-9 68K? Ball had a few ans

"You can now have a BASIC09 workspace nearl megabytes long. And, real data is stored in eight instead of five. In fact, both real and integer numbers a much greater range," Ball said. "Because of the l workspace you can build a lot of valid tools with BASIC09. You can also handle bigger jobs because yo work with more data in memory."

Does all this hoopla about OS-9 68K mean the and the Color Computer will go the way of CP/M?

"Definitely not! We are very much locked into the 6 Ball said. "We have a large investment in the 6809 9 and so do our customers. Because of this we are g to continue to support it and are working on several products. For example, our full FORTRAN compiler sh be released very soon."

Most of you have probably already read about a of the enhancements built into OS-9 68K. You've prob also wondered if you will ever see them in the C Computer version of OS-9.

"It is our general policy to move technology from processor to another when possible," Ball said. "This our customers a more unified environment when upgrade to a new chip. It helps us make the diff versions of our operating system look the same to the user. Unfortunately, the 64K addressing range avail on the 6809 means we cannot make our utilities as as we would like to and this reality is tying our h somewhat."

Ball told us that Microware, which made a big n for itself by designing and writing software for dedic

---

(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He is the author of The Official BASIC09 Tour Guide, *published by Microware and* The Official Rainbow Guide to OS-9, *published through the Rainbow Bookshelf. He serves on the InfoWorld Software Review Board and is a chief warrant officer in the U.S. Coast Guard.)*

process control systems, was starting to make a big splash in the personal computer marketplace. He predicted they would establish an even bigger beachhead in the war for personal computer supremacy within the next year or two.

"We have made a big splash in the personal computer industry in Japan. And, OS-9 is still popular at Tandy," Ball said. This statement prompted me to ask the "64K question." If OS-9 has been so popular in Japan, why haven't these companies moved it into the U.S. market? Like any good PR man, Ball had the answer.

"OS-9-based machines are so much in demand in Japan that they have had to convert factories to keep up with the two-month backlog," he said. "They can't even think about selling machines here until they catch up at home."

New Trends Appearing

We noticed several trends emerging in both hardware and software at RAINBOWfest Chicago. In hardware everything is pointing toward hard disk systems that deliver several million bytes of storage at an affordable price. Since OS-9 is a disk intensive operating system, this is a real blessing.

To find out about these trends we interviewed several industry leaders. The first to sit down across from our trusty TRS-80 Model 100 was Steve Odneal of P.R.O. Systems, 10601 West 63rd Street, Shawnee, KS 66203 (913-631-0665). Steve made a name for himself by being one of the first programmers to move FLEX, Technical Systems Company's operating system, to the Color Computer. Now, he has designed the hardware and written the software for the 10-meg hard disk P.R.O. Systems was demonstrating in Chicago.

"It's a full implementation of a hard disk for the Color Computer," Odneal said. "This means the software treats the hard disk as a full-size hard disk. It also means that with OS-9 you can format the entire 10 megabyte drive and wind up with almost 40,000 free sectors. The hard disk controller that comes with the unit also supports up to four additional floppy disk drives, either five- or eight-inch.

"We supply the complete package — everything you need," Odneal added. "OS-9 made the job easy because it let us install our hard disk system by simply adding a new device driver and device descriptor. In plain English, the device driver contains the software that actually communicates with the hard disk. The device descriptor tells OS-9 what our drive looks like. The device descriptor also let us reserve part of the hard disk for Radio Shack DOS programs and another part for FLEX programs."

Using a hard disk with OS-9 really speeds up your work. Steve made his point by loading BASIC09. It took his Color Computer seven seconds to load the program's 22K of code from a floppy. The P.R.O. Systems hard disk loaded it in two seconds.

"Overall, the hard disk is about two and a half times faster than a floppy disk," Steve said. "But, it seems even faster when you are using OS-9 because OS-9 needs to access its directories continuously every time it reads or writes a file."

Odneal was selling the new slim-line hard disk at a special price of $995 during RAINBOWfest. On the market he expects it to sell for $1,295 to $1,495 — depending on the dealer.

The P.R.O. disk system features a heavy-duty cas
power supply. Odneal learned how heavy-duty whe
drive he brought to RAINBOWfest was thrown 12
by a baggage attendant at O'Hare Airport. "We were a
it wouldn't work at all after watching it hit the deck
it worked flawlessly at the show," he said.

P.R.O. supplies all the software you need to instal
run its hard disk — drivers for Radio Shack DOS, F
and OS-9 and a program that automatically confi
the drive. They also give you a handful of wild card uti
that make it easy to copy and delete files, and per
other routine file maintenance chores.

To boot OS-9 or FLEX, you simply run a Radio S
Disk Extended BASIC program and type 'o' for OS-
'f' for FLEX when prompted. Odneal noted that his
version of the software will let you boot OS-9 directl
the hard disk. He said it would be available by the
you read this column.

But Odneal was displaying only one of the three
disks we saw at the show. Brian Lantz stayed
throughout the weekend demonstrating his handiwo
the J & M Systems booth (15100-A Central
Albuquerque, NM 87123, 505-292-4182). He was espec
proud of the fact that his drivers for the new J & M
megabyte full-size hard disk system give full use of
9's fantastic type-ahead feature. J & M's system feat
a full-size five megabyte hard drive and an attractive p

Meanwhile, up in the Users Group hospitality s
Martin Nelsen of a new start-up company na
Interactive Task Management System, 230 East
Street, West Chicago, IL 60185 (312-293-0549) — IT
Inc. for short — was showing off his new Hard
subsystem for the Color Computer. The ITMS drive
also a full-size five megabyte model and comes with a
and power supply. Its controller card can support
additional disk drives. A patch for the Radio Shack ver
of the OS-9 C Compiler lets you install C on the d
The list price for this unit is $599.95; they were se
it at RAINBOWfest for $529.95.

***DynaCalc* for OS-9 Available**

We received some good news shortly after we ent
the exhibit hall at RAINBOWfest Friday evening.
Turner of Computer Systems Center in St. Louis,
publisher of *Dynamite* and many other programs for
Color Computer, pulled me aside and waved a bright g
box in the air. Bold white letters in a classy sans
typeface screamed "Tandy" from the side of the
DynaCalc for OS-9 had finally arrived at local Radio Sh
stores around the nation.

Turner couldn't wait to show me *DynaCalc* run
under OS-9 68K on his QT from FHL. There were
more features than we can detail here, but among o
things, the version we saw would let you use more
17,000 rows or columns. And, it was lightning quick. A
the demonstration, we made Joe promise to reserve a
minutes to discuss OS-9 with us before the weekend
over. He went one better and showed up for the interv
Sunday with Scott Schaeferle, the programmer who ma
DynaCalc tick.

We led the interview with another 64K question: A
software developer, what do you think gives you
advantage?

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interval timer for time sharing, 4 serial ports
h selectable baud rates from 300 to 19,200, 2
ıtronics compatible parallel printer ports. Sup-
ts 2 double sided double density 96 tpi floppy
k drives and a SCSI (SASI) bus interface for
ıchester disk drives. The QT is available as a
gle floppy (1), a dual floppy (2) or as a single
ppy and a 10 or 20 megabyte hard disk (HD).
e 5 1/2 high, 11 1/2 deep, 9 1/2 wide. Can be
unted vertically or horizontally.

oftware Included!

FTWARE included is OS-9/68000, the 68000
sion of the proven OS-9 operating System that
both disk and file compatible with standard and
lor computer versions of OS-9. Basic09 is the
000 version and is source compatible with the
09 version. DynaCalc is the 68000 version of the
oven 6809 spreadsheet. Stylograph is the 68000
sion of the popular 6809 word processor. Mail
rge and speller are the 68000 versions of those
grams. Programming tools included are a
ocating macro assembler with linkage editor,
een and line editors, and an interactive
bugger. The software has a retail value in excess
$2000 and is INCLUDED free! Programming
guages available and under development
lude C, Pascal, Fortran and Sculptor.

A Hellava Deal!

The QT is available in four basic configurations. Other configurations are possible and are available. Call for price.

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Note: The QT can hold 2 half height drives internally (floppy or hard). Provision has been made for hooking up external floppy drives. This allows using large capacity full height hard disk drives in the QT case with floppy drives in another case. You can boot from the hard disk so floppys would only be necessary for program transfers and backup. Removable hard drives are also available. Call or write for complete specifications and prices.

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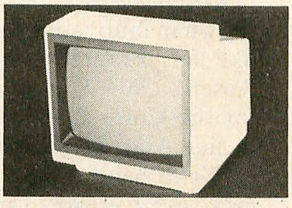

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"One of the biggest things OS-9 has to offer is its standardization of input and output," Turner said. "Just look at some of the programs that run under Radio Shack DOS. They are all surrounded with controversy about the Color Computer ROM call tables. This controversy just doesn't exist when you use OS-9.

"Besides, OS-9 has saved us a lot of time . . . and time is money," Turner said. "Indirectly, it has also saved our customers a lot of money, too — for the same reason. Additionally, OS-9 lets us write a piece of code once. When we get it right the first time it saves everyone a lot of confusion later on."

Turner then gave us an example of OS-9 efficiency.

"We use the OS-9 "get status" system calls rather than hard code to find the screen size for *DynaCalc*," he said. "One call returns both the number of columns and the number of rows on the screen. Once *DynaCalc* has this information, it automatically sizes itself to fit this screen."

Turner told us that OS-9 also made it much easier for *DynaCalc* to support the many different printers on the market. "*DynaCalc* simply sends its printer output to the standard printer output device (/p) and works with any printer that uses this device.

"The same goes for disk drives. OS-9 *DynaCalc* can store files on any disk drive connected to your computer. Contrast this with the Disk BASIC version of *DynaCalc* which only works with standard hardware like Radio Shack or J & M. We really don't have to worry about any of the low level details when we program with OS-9; we just read from and write to OS-9's standard input/output paths," Turner said.

Turner brought *DynaCalc* author Scott Schaeferle along for the interview and asked him what he liked about OS-9.

"I like the flexibility of its memory management and the way it loads and links modules," he said. "This came in very handy and made it easy for us to install "/sx," the system execute command which lets you run another OS-9 program without quitting *DynaCalc*. All we had to do was make a system call to OS-9 that puts *DynaCalc* to sleep while the other program is running. When the other program is through, the Shell wakes up *DynaCalc* and you can go back to your spreadsheet work."

Schaeferle, like everyone else we talked to at RAINBOWfest, was impressed with OS-9 68K. He likes the wild card matching, the alphabetized directories and the RAM disk that comes as a standard part of the system. He said he was especially impressed with the 68K Copy utility, which like most of the 68K utilities, uses the wild card feature built into the new Shell.

Rosen Premiers *OS-9 Solution*

Bob Rosen of Spectrum Projects, 93-15 86th Drive, P. O. Box 21272, Woodhaven, NY 11421, took time out from his busy schedule at RAINBOWfest to talk with us about several of the new products he is aiming at the OS-9 market. He was beaming about the release of his *OS-9 Solution*, a program he feels is a major breakthrough for novice OS-9 users.

"I get letters. I talk to Radio Shack sales managers. And, the calls pour into my company. The average guy who has bought a 64K Color Computer eventually buys OS-9. Then he gets frustrated and puts it back in the box,"
Rosen said. "I think a front-end program like t
9 Solution is the absolute answer to an OS-9 beg
prayers. I think Tandy should pick it up.

"I hope that people who do buy the *OS-9 Solutio*
Barry Thompson, Tandy's Color Computer p
manager, and tell him what they get from the pro
he said.

Rosen also expressed concern that the lack of i
shown in innovative programs would cause software
like Jeff Francis of MegaSoft, who designed and
Rosen's *OS-9 Solution*, to lose interest in writing pro
for the Color Computer. "I'm afraid he'll look else
— like Atari or Amiga.

"I still believe OS-9 has a very good future and v
make every effort to support it at Spectrum," Rosen

Rosen had just finished teaming up RAINBOW's
Downard and Brian Lantz to write OS-9 RAM disk c
for his new ThunderRam, a 256K upgrade for the
Computer. He believes a RAM disk like this will
the *OS-9 Solution* even more popular.

"You can use the extra RAM memory as a print s
to hold 30 Hi-Res screens, or to run four 32K pro
in the four different banks at the same time."

A Closer Look at 'the Solution'

So, just what is this *OS-9 Solution* Bob Rosen is p
so hard? Essentially, it is a single program that let
run any one of 19 individual OS-9 commands with a
keystroke. It stays in your standard execution dire
/d0/CMDS.

The exciting point, however, is that you almost
need to type a filename or one of those super lon
9 pathlists. With the *OS-9 Solution* you use the up
down-arrow keys to point to the file you want to
with, then type a single key to tell OS-9 to carry ou
of 19 different actions. It sells for $39.95.

The *Solution* runs on vanilla Color Computer OS
Version 1.01 — as well as Hi-Res from FHL and the
Pak from PBJ. The only catch is that your screen d
must use the standard Radio Shack OS-9 cursor c
sequence. Of course, you could always write a p
translate Radio Shack cursor control sequences in
XYZ cursor control sequence.

Eight of the utilities can also work on multiple
Utilities built into the *Solution* that are not availa
the standard issue Color Computer OS-9 CMDS dire
include:

Alphabetize Directory
GoTo a new Director
Help screens
Information about a file
Jumble order of filenames
Set Directories

I believe the *Solution* could be very handy for ses
where you are performing a lot of file maintenanc
this assignment it will save you a lot of keystrokes.

However, this program is not for all jobs. It is too
to leave in memory all the time with Level I OS-9.
example, you can't run BASIC09 from it. Both prog
will not fit in memory.

OS-9 Level II — if it ever comes to the Color Com
— will be a whole new ball game and most everyone

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probably want to boot up into the *OS-9 Solution*. Also, to build pipelines and exercise OS-9's multitasking capabilities, you'll need to use the *Solution*'s Z command to escape to the OS-9 Shell.

Overall, this program should make OS-9 a whole lot less scary to the beginner. It may even ease some of the pain of routine file maintenance tasks for the experienced user.

Put the Mouse to Work

You can't do it just yet, but very soon now you may see a mouse-based editor that runs on Color Computer OS-9. Michael L. Bailey of Cameron, Mo., distributed a few test copies of a full-screen editor named *TED* and a companion text processor for Color Computer OS-9 at RAINBOWfest-Chicago.

To run it, you need a 64K Color Computer with at least one disk drive and the OS-9 operating system. The Color Computer mouse from Radio Shack or a joystick is optional.

I test drove Mike's editor using a joystick and was so impressed I almost ran out to Radio Shack and bought a mouse. The presentation is not as pretty as the high density bit mapped Apple Macintosh *MacWrite* program, but the pull-down menus work the same way. The program was a breeze to use and got me excited about OS-9's future.

Bailey hasn't sold the program to a distributor yet, but I'm betting he will. He is literally on to something very big. Why? Follow the easy steps you use to move a block of text.

Move the cursor into the menu bar and push the mouse button to pull down the "block" menu. Then, move the cursor down with the mouse to the word "BlockKopy." You'll know you're in the right place because *TED* will highlight the word to which you are pointing. Now, push the mouse button again; *TED* will tell you you have gone into the BlockKopy mode at the top of the screen.

Now all you need to do is use the mouse to point the cursor at the beginning of the block of text you want to move and push the button. "Mouse" the cursor to the end of the block and push the button again — the selected text disappears. Next, pull down the block menu again and select the BlockPaste command, then place the cursor where you want the text and push the button on the mouse. The text magically appears in the new location.

The whole process is completely intuitive. After a few minutes with the mouse you don't even think about what you're doing. You just do it. In fact, it is much harder to describe than it is to do.

There are a few little problem areas in the test version we played with but I'm sure they'll be removed before the program is distributed. For example, Bailey needs to add word wrap ability to the program. It irritates me to no end to see a word split in the middle at the end of a line. And, when you use the arrow keys, life would be easier if *TED* would let you hold down the key to auto repeat.

Operation with the joystick was a little erratic — a hardware problem that Bailey warned us about — but it sure gave us a feel for how this editor is going to work. And, Bailey is already thinking about supplying a driver that would let you use the mouse with the special high precision hardware input device that comes with *CoCo Max* — the Color Computer version of *Mac Paint*.

Yet Another Utility Package

A month or two ago we mentioned that we didn't whether or not Saturn Electronics Company was still s their OS-9 bulletin board system. We received the a recently — in the form of program manuals — from Dionysiou at Saturn.

Saturn — also doing business as DSS Perip Corporation, 62 Commerce Drive, Farmingdale, NY 1 516-249-3388 — is selling 22 OS-9 utility programs package named *Utilipak* for $99. Most of the standards like grep, mv and tr are in the package, there's even an alarm clock.

The name of Saturn's OS-9 Bulletin Board Syst "Co9." To run it you need a 64K Color Computer, disk drives, OS-9 and BASIC09. Co9 was written in BA and has 11 commands.

Questions, Answers, Tips and a Few Listings

Our first tip for the month was contributed by P. Do Van Dusen, a U.S. Air Force Tech Sergeant at Holl AFB in New Mexico. He wrote a short BASIC09 proc to emulate the `PRINT@` command in Radio Shack Exte Color BASIC. It's named *prnt*.

When you run *prnt* you pass two integer param — the column and the row where you want the c to go. For example, to move the cursor to the top hand corner of the screen, you would use a calling sequ like this.

```
DIM column, row: INTEGER

column := 0
row := 0

RUN prnt (column, row)
```

The utility will work with Hi-Res in FHL's *O-Pak* with PBJ's *Word-Pak* when it is running in the Radio S compatible mode. It may also run with other OS-9 sc drivers. The only requirement is that the screen uses standard Radio Shack OS-9 cursor control characters.

Tom Wong of Oakland, Calif. wrote to ask ho initialize OS-9's Color Computer graphics mode control the cursor from within an assembly *lang* program. Let's start with the cursor control problem s we just showed you how to do it with BASIC09.

To control the OS-9 cursor you need to send a th character sequence to the screen. The first character send must have a binary value of two. This means binary or 0000 0010 and not two in ASCII, which is actu 32 or 0011 0010 in binary.

When the OS-9 screen driver receives a '2', it kn that you are trying to tell it to reposition the cursor. Furt it expects you to follow the '2' with two additi characters. The first character is computed by adding decimal —that's 20 Hex — to your desired column num The second character must contain the sum of the des row number and 32 decimal. In BASIC09, Van Dusen it with this statement:

```
PRINT CHR$(2); CHR$(column+32); CHR$(row+32)
```

nce the BASIC09 PRINT statement sends its output to ’s standard output path and since the standard output is normally sent to the screen if it hasn't been ected, the BASIC09 statement above simply sends out characters to the screen —a binary two, followed e column number and row number plus 32 — exactly t the OS-9 screen driver needs to know.

do the same thing in assembly language you will t to use the OS-9 I$WRITE system call. When you e this call, you must pass three parameters in the 6809 ters. Register X must contain the starting address of data you want to send. Register Y must contain the ber of bytes of data you want to send. And, Register ust contain the number of the path that you want ceive your data.

rst reserve three bytes of memory where you are going ace the cursor control string. Something like this should he job.

```
thNo fcb 1   *** Standard output
EFIX fcb 2   *** the screen driver prefix character
l    rmb 1
w    rmb 1
sCol rmb 1
sRow rmb 1
```

hen initialize your data. For example, to move the or to the top left-hand corner of the screen try this:

```
lda #0
adda #32
sta col
lda #0
adda #32
sta row
```

a real program you would probably want to use two itional variables containing the desired column location row to create a universal subroutine. For example:

```
lda DesCol
adda #32
sta Col
lda DesRow
adda #32
sta Row
```

Now that the data is initialized, you must initialize the registers and send the data to the screen.

```
leax PREFIX, u   *** put addr of Prefix in X-register
ldy #3           *** we want to send three bytes
lda PathNo       *** Get the path number in A-register
OS9 I$WRITE      *** Now make the call
bcs error        *** handle error if carry bit is set
...              *** else go on about your business
```

In a nutshell, that's how to position the cursor in assembly language. In a real program you would most likely put several of the sequences above into subroutines and then call them when you need them. For example:

```
bsr getpos       *** initialize cursor data
bsr setpos       *** actually send data to set position
...              *** continue your application program
```

To tell OS-9 you want to go into the graphics mode, you need to send the character 15 decimal and two additional characters to the standard output path. (This means you could also use the routines above to do the job.) Except this time you will need to store the value of your desired graphics mode in the "DesCol" variable and store the value of the color set you want in the "DesRow" variable. The value you need for these codes can be found in the tables on Page 128 of the *OS-9 Commands* manual (the red one).

H. Bruce Phillips of Bolingbrook, Ill. contributed a nifty BASIC09 program that will give you a formatted listing of a BASIC09 procedure without the line numbers. To do the job, it reads a file that contains a listing produced by the standard BASIC09 LIST command.

Tom Fields helped with the procedure which is set up to work with an Epson MX-80 printer. Use the following steps, however, before you run it, make sure you have previously saved the procedures you are listing.

1) LIST the program to a temporary file named "temp"
2) KILL*
3) LOAD *prfile*
4) RUN *prfile*

The final listing comes from Steve Roberson of Chandler, Ariz. who works for Motorola Microsystems and does most of his development on the EXORset. His contribution is a procedure he uses in a BASIC09 bulletin board system on his Color Computer. It loads the filenames from a directory into an array. This gives him the ability to list downloads and search a user's directory for mail.

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Steve asked about eavesdropping on a BBS user on the Color Computer screen. I don't believe you can do it, Steve. However, you may want to try redirecting the output of the BBS into an OS-9 TEE filter to send a copy of the BBS output to a disk file, your printer or another terminal connected to the RS-232 bit banger port, since you appear to be using the ACIA program pack for your BBS.

TEE would even let you send a copy of the output to the device /TERM which would put it on the Color Computer screen like you want. However, the operation most likely won't be smooth because of the way OS-9 writes to /TERM. In fact, you will probably receive the data from the BBS in bursts each time you hit the ENTER key on the Color Computer keyboard. Give it a try and let us know how it works out.

Next month the television soaps will be gearing up with a brand new season. Let's cross our fingers and hope we get to see some of that fantastic new hardware that's been hanging on the cliff for so long! Rest assured, if we hear any news, we'll let you know.

The listing:

```
PROCEDURE prnt
 0000       PARAM col,row:INTEGER
 000B       DIM c,r:INTEGER
 0016       c:=col
 001E       r:=row
 0026       PRINT CHR$(2); CHR$(c+32); CHR$(r+32);
 003C       END
PROCEDURE prlist
 0000       DIM prpath,filepath:BYTE
 000B       DIM line:STRING[255]; ans:STRING[1]
 0022
 0023       RUN SetupPrinter
 0027
 0028       REPEAT
 002A         OPEN #filepath,"temp":READ
 0039         OPEN #prpath,"/p":WRITE
 0046
 0047         WHILE NOT(EOF(#filepath)) DO
 0052           READ #filepath,line
 005C           IF LEN(line)>4 AND LEFT$(line,1)<>"P" THEN
 0074             line="     "+RIGHT$(line,LEN(line)-5)
 008C           ENDIF
 008E           WRITE #prpath,line
 0098         ENDWHILE
 009C
 009D         PRINT #prpath,CHR$(12)
 00A7         CLOSE #filepath,#prpath
 00B2
 00B3         RUN query("print another listing? (y/n) ",ans)
 00DD       UNTIL ans="n" OR ans="N"
 00F1       DELETE "temp"
 00F9       END
PROCEDURE query
 0000       PARAM message:STRING[40]; reply:STRING[1]
 0017       DIM ok:BOOLEAN
```

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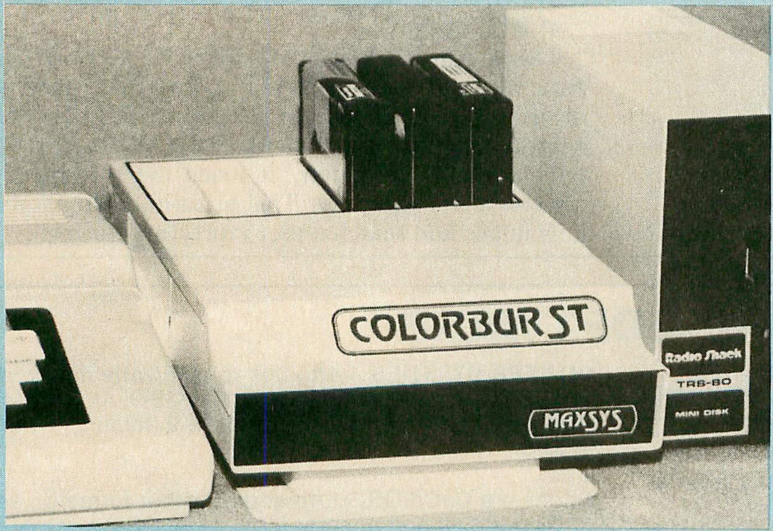

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```
E
F        ok:=FALSE
25
26       REPEAT
28         PRINT message;
2E         INPUT reply
33         PRINT
35
36         IF reply="y" OR reply="Y" OR reply="n" OR reply="N" THEN
5B           ok:=TRUE
51         ELSE
55           PRINT "what?"
5E         ENDIF
70
71       UNTIL ok
79       END
7B
CEDURE SetupPrinter
00       DIM prpath:BYTE; ans:STRING
0D
0E       OPEN #prpath,"/p":WRITE
1B       RUN query("skip over perforations? (y/n) ",ans)
46
47       IF ans="y" OR ans="Y" THEN
5C         PRINT #prpath,CHR$(27); "N"; CHR$(4)
6E       ENDIF
70
71       RUN query("emphasized print? (y/n) ",ans)
96
97       IF ans="y" OR ans="Y" THEN
AC         PRINT #prpath,CHR$(27); "E"
BA       ENDIF
BC
BD       RUN query("double strike? (y/n) ",ans)
DF
E0       IF ans="y" OR ans="Y" THEN
F5         PRINT #prpath,CHR$(27); "G"
03       ENDIF
05
06       CLOSE #prpath
0C       END
CEDURE readdir
00       (* loads filenames from directory into an array *)
32       (* contributed by Steve Roberson *)
55
56       DIM path:INTEGER
5D       DIM filename(20):STRING[32]
6E       DIM char:STRING[1]
7A       INPUT "Enter directory name: ",dir$
98       OPEN #path,dir$:READ+DIR
A4       num=63
AC       dn=0
B4 100   fl$=""
BE       FOR x=1 TO 32
D0         num=num+1
DC         SEEK #path,num
E6         IF EOF(#path) THEN 200
F3         GET #path,char
FD         ac=ASC(char)
07         IF ac=0 AND x=1 THEN
1C           num=num+31
28           GOTO 100
2C         ENDIF
2E         IF ac>127 THEN ac=ac-128
46           fl$=fl$+CHR$(ac)
54           num=num+(32-x)
64           dn=dn+1
70           filename(dn)=fl$
7D           GOTO 100
81         ENDIF
83         fl$=fl$+CHR$(ac)
91       NEXT x
9C 200   CLOSE #path
A5       FOR x=1 TO dn
B7         PRINT filename(x)
C0       NEXT x
CB       END
```

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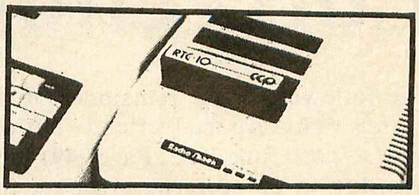

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MAIL09 Correction

The following is the remainder of the listings that were inadvertently left out of *MAIL09* (June 1985, Page 249). This was due to an editorial error on our part here at THE RAINBOW, and was not the fault of the author, Timothy A. Harris. Please refer to last month's *MAIL09* Correction (July 1985, Page 266) for listings 2-9. Again, we apologize for any inconvenience this may have caused, either to Mr. Harris or to our readers.

Listing 10:

```
PROCEDURE alterentry
 0000      TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname

            :STRING[25]; fname:STRING[10]; address1:STRING; address2

            :STRING; city:STRING[15]; state:STRING[10]; zip:STRING

            [10]; phone:STRING[14]
 0069      TYPE indextype=name:STRING[25]; number:BYTE
 007F      PARAM label:labeltype
 0088      PARAM index(100):indextype
 0096      PARAM listfile:STRING[5]
 00A2      PARAM indexfile:STRING[6]
 00AE      DIM tempname:STRING
 00B5      DIM id,fd,numentries,entrynumber:INTEGER
 00C8      DIM resp:STRING[1]
 00D4      DIM keyname:STRING[25]
 00E0      RUN clearscreen
 00E4      PRINT "                        MAIL09"
 0104      PRINT "                Alter Individual Entry"
 012C      PRINT "                ======================"
 0154      PRINT
 0156      OPEN #fd,listfile:UPDATE
 0162      OPEN #id,indexfile:UPDATE
 016E      RUN getindex(id,index,numentries)
 0182      PRINT
 0184      IF listfile="clist" THEN
 0195        INPUT "    Company Name of desired entry   : ",keyname
 01C3      ELSE
 01C7        INPUT "    Last Name of desired entry      : ",keyname
 01F5      ENDIF
 01F7      PRINT "          Enter changes where needed or enter"
 0229      PRINT "            a '*' to keep a field the same"
 0258      RUN findentry(keyname,index,numentries,fd,label,entrynumber

            )
 027B      IF entrynumber=-1 THEN
 0288        PRINT "Entry does not exist!"
 02A1      ELSE
 02A5        IF listfile="clist" THEN
 02B6          INPUT "Is the Company Name the same ? ",resp
 02DD          IF resp="n" OR resp="N" THEN
 02F2            INPUT "New Company Name     : ",label.companyname
 0315            index(entrynumber).name:=label.companyname
 0327            SEEK #id,(entrynumber-1)*SIZE(index)
 033A            PUT #id,index(entrynumber)
 0348          ENDIF
 034A          INPUT "New Last Name        : ",tempname
 0369          IF tempname<>"*" THEN label.lname:=tempname
 0381          ENDIF
 0383        ELSE
 0387          INPUT "Is the Last Name the same ? ",resp
 03AB          IF resp="n" OR resp="N" THEN
 03C0            INPUT "New Last Name  : ",label.lname
 03DD            index(entrynumber).name:=label.lname
 03EF            SEEK #id,(entrynumber-1)*SIZE(index)
 0402            PUT #id,index(entrynumber)
 0410          ENDIF
 0412        ENDIF
 0414        INPUT "New First Name       : ",tempname

 0432        IF tempname<>"*" THEN label.fname:=tempname
 044A        ENDIF
 044C        INPUT "New Title            : ",tempname
 046A        IF tempname<>"*" THEN label.title:=tempname
 0482        ENDIF
 0484        INPUT "New Address 1        : ",tempname
 04A2        IF tempname<>"*" THEN label.address1:=tempname
 04BA        ENDIF
```

ting 11:

```
CEDURE addtolist
0       TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname

          :STRING[25]; fname:STRING[10]; address1:STRING; address2

          :STRING; city:STRING[15]; state:STRING[10]; zip:STRING

          [10]; phone:STRING[14]
59      TYPE indextype=name:STRING[25]; number:BYTE
7F      PARAM label:labeltype
38      PARAM index(100):indextype
96      PARAM listfile:STRING[5]
A2      PARAM indexfile:STRING[6]
AE      DIM fd,id,numentries,i:INTEGER
C1      DIM alldone:BOOLEAN
C8      RUN clearscreen
CC      PRINT "                              MAIL09"
F0      PRINT "                        Add Entries to List"
B       PRINT "                        ==================="
6       OPEN #fd,listfile:UPDATE
2       OPEN #id,indexfile:UPDATE
E       RUN getindex(id,index,numentries)
2       alldone:=FALSE
8       SEEK #fd,numentries*SIZE(label)
8       PRINT "                        Enter Data at Prompts"
5       IF listfile="clist" THEN
6         PRINT "               Hit <ENTER> for Company Name to END"
9       ELSE
D         PRINT "                 Hit <ENTER> for Last Name to END"
F       ENDIF
1       PRINT "                 or to leave another field blank"
3       REPEAT
5         PRINT  \ PRINT
9         RUN inputdata(label,listfile,alldone)
D         IF NOT(alldone) THEN
7           numentries:=numentries+1
2           index(numentries).number:=numentries-1
4           IF listfile="clist" THEN
5             index(numentries).name:=label.companyname
7           ELSE
B             index(numentries).name:=label.lname
D           ENDIF
F           PUT #fd,label
9         ENDIF
B       UNTIL alldone OR numentries>=100
A       CLOSE #fd
0       RUN mailsort(1,numentries,index)
2       SEEK #id,0
B       FOR i:=1 TO numentries
C         PUT #id,index(i)
A       NEXT i
5       CLOSE #id
B       END
C         INPUT "New Address 2        : ",tempname
A         IF tempname<>"*" THEN label.address2:=tempname
2         ENDIF
4         INPUT "New City             : ",tempname
2         IF tempname<>"*" THEN label.city:=tempname
A         ENDIF
C         INPUT "New State            : ",tempname
A         IF tempname<>"*" THEN label.state:=tempname
2         ENDIF
4         INPUT "New Zip Code         : ",tempname
2         IF tempname<>"*" THEN label.zip:=tempname
A         ENDIF
C         INPUT "New Phone Number     : ",tempname
A         IF tempname<>"*" THEN label.phone:=tempname
2         ENDIF
4         SEEK #fd,index(entrynumber).number*SIZE(label)
A         PUT #fd,label
4       ENDIF
6       CLOSE #id
C       CLOSE #fd
2       END
```

ting 12:

```
EDURE updatelist
0       TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
```

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```
           :STRING[25]; fname:STRING[10]; address1:STRING; address2

           :STRING; city:STRING[15]; state:STRING[10]; zip:STRING

            [10]; phone:STRING[14]
0069      TYPE indextype=name:STRING[25]; number:BYTE
007F      PARAM label:labeltype
0088      PARAM index(100):indextype
0096      PARAM listfile:STRING[5]
00A2      PARAM indexfile:STRING[6]
00AE      DIM add,alter,delet:STRING[11]
00C2      DIM resp:BYTE
00C9      add:="addtolist"
00D9      alter:="alterentry"
00EA      delet:="deleteentry"
00FC      LOOP
00FE        RUN clearscreen
0102        PRINT "                       MAIL09"
0123        PRINT "                  Update Mailing List"
014C        PRINT "                  ==================="
0175        PRINT
0177        PRINT "                1 -- Add to Existing File"
01A4        PRINT "                2 -- Alter Existing Entry"
01D1        PRINT "                3 -- Delete Existing Entry"
01FF        PRINT "                0 -- Return to Main Menu"
022B        PRINT
022D        INPUT "                      Selection : ",resp
0257      EXITIF resp=0 THEN
0263      ENDEXIT
0267        IF resp=1 THEN RUN add(label,index,listfile,indexfile)
028B          KILL add
0290        ELSE IF resp=2 THEN RUN alter(label,index,listfile,indexfile

                 )
02B7            KILL alter
02BC          ELSE IF resp=3 THEN RUN delet(label,index,listfile,indexfil

                   )
02E3              KILL delet
02E8            ELSE RUN entryerror
02EF            ENDIF
02F1          ENDIF
02F3        ENDIF
02F5      ENDLOOP
02F9      END
```

Listing 13:

```
PROCEDURE createlist
 0000      TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname

            :STRING[25]; fname:STRING[10]; address1:STRING; address2

            :STRING; city:STRING[15]; state:STRING[10]; zip:STRING

             [10]; phone:STRING[14]
 0069      TYPE indextype=name:STRING[25]; number:BYTE
 007F      PARAM label:labeltype
 0088      PARAM index(100):indextype
 0096      PARAM listfile:STRING[5]
 00A2      PARAM indexfile:STRING[6]
 00AE      DIM fd,id:INTEGER
 00B9      DIM i,entrynumber:INTEGER
 00C4      DIM alldone:BOOLEAN
 00CB      entrynumber:=0
 00D2      alldone:=FALSE
 00D8      RUN clearscreen
 00DC      PRINT "                       MAIL09"
 00FD      PRINT "                Create Mailing List"
 0125      PRINT "                ==================="
 014E      CREATE #fd,listfile
 0158      CREATE #id,indexfile
 0162      PRINT "                Enter Data at the Prompts"
 0190      IF indexfile="cindex" THEN
 01A2        PRINT "             Hit <ENTER> for Company Name to END"
 01D6      ELSE
 01DA        PRINT "             Hit <ENTER> for Last Name to END"
 020B      ENDIF
 020D      PRINT "             or to leave another field blank"
 023E      REPEAT
 0240        PRINT \ PRINT
 0244        RUN inputdata(label,listfile,alldone)
 0258        IF NOT(alldone) THEN
```

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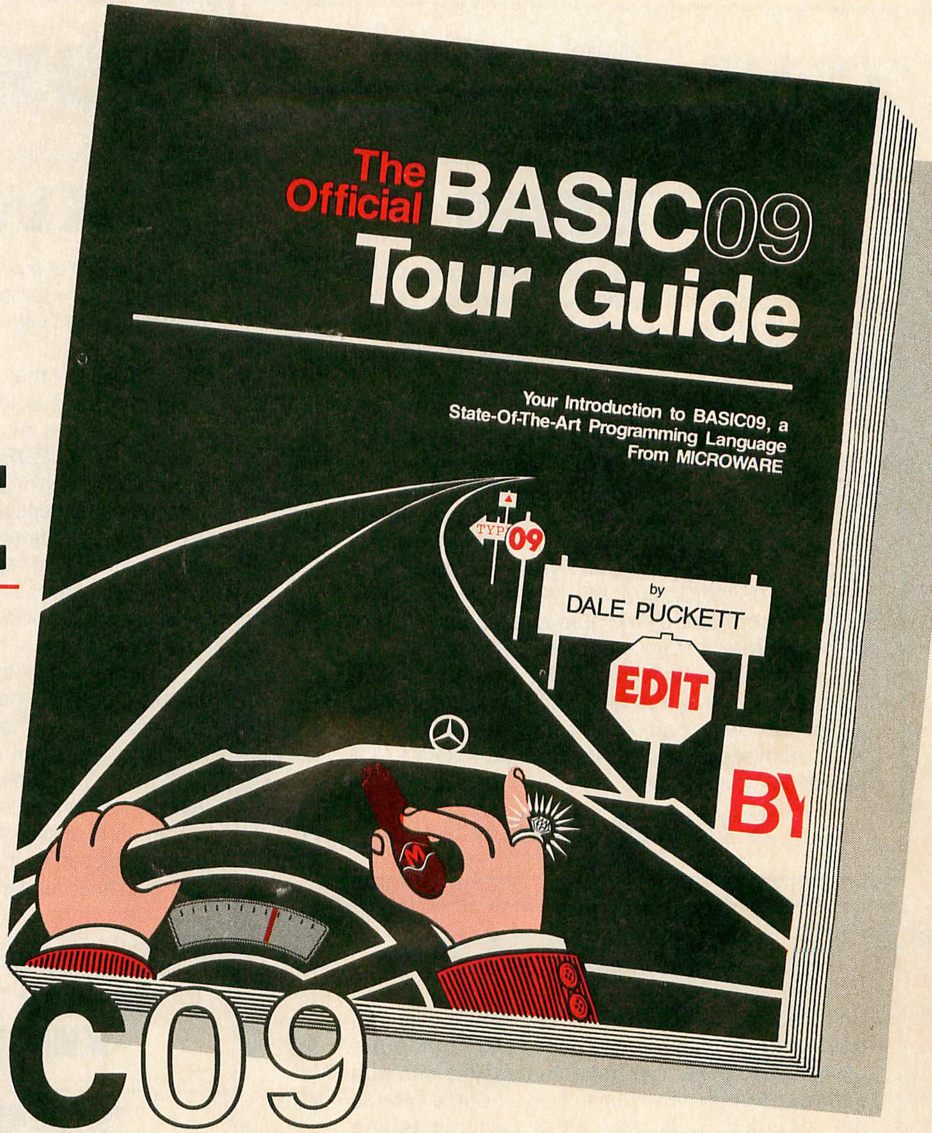
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```
        entrynumber:=entrynumber+1
        index(entrynumber).number:=entrynumber-1
        IF indexfile="cindex" THEN
          index(entrynumber).name:=label.companyname
        ELSE
          index(entrynumber).name:=label.lname
        ENDIF
        PUT #fd,label
      ENDIF
    UNTIL alldone OR entrynumber>=100
    CLOSE #fd
    RUN mailsort(1,entrynumber,index)
    FOR i:=1 TO entrynumber
      PUT #id,index(i)
    NEXT i
    CLOSE #id
    END
```

ing 14:

```
DURE mailsort
      TYPE indextype=name:STRING[25]; number:BYTE
      PARAM bot,top:INTEGER
      PARAM index(100):indextype
      DIM pass,j:INTEGER
      DIM integerchange:BOOLEAN
      integerchange:=TRUE
      pass:=1
      WHILE pass<=top-1 AND integerchange DO
        integerchange:=FALSE
        FOR j:=1 TO top-pass
          IF index(j).name>index(j+1).name THEN
            integerchange:=TRUE
            RUN xchange(index(j),index(j+1))
          ENDIF
        NEXT j
        pass:=pass+1
      ENDWHILE
      END
DURE xchange
      TYPE indextype=name:STRING[25]; number:BYTE
      PARAM a,b:indextype
      DIM temp:indextype
      temp:=a
      a:=b
      b:=temp
      END
```

ing 15:

```
EDURE mainmenu
      TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname

       :STRING[25]; fname:STRING[10]; address1:STRING; address2

       :STRING; city:STRING[15]; state:STRING[10]; zip:STRING

       [10]; phone:STRING[14]
      TYPE indextype=name:STRING[25]; number:INTEGER
      PARAM label:labeltype
      PARAM index(100):indextype
      PARAM listfile:STRING[5]
      PARAM indexfile:STRING[6]
      DIM creat,updat,disp,prnt,make,one:STRING[10]
      DIM resp:BYTE
      creat:="createlist"
      updat:="updatelist"
      disp:="displaylist"
      prnt:="printlist"
      make:="makelabel"
      one:="onelabel"
      LOOP
        RUN clearscreen
        PRINT "                    MAIL09"
        PRINT "                  Main  Menu"
        PRINT "                  =========="
        PRINT
        PRINT "            1 -- Create Mailing List"
        PRINT "            2 -- Update Mailing List"
        PRINT "            3 -- Display Mailing List"
        PRINT "            4 -- Print Mailing List"
        PRINT "            5 -- Print Mailing Labels"
        PRINT "            6 -- Print Individual Labels"
```

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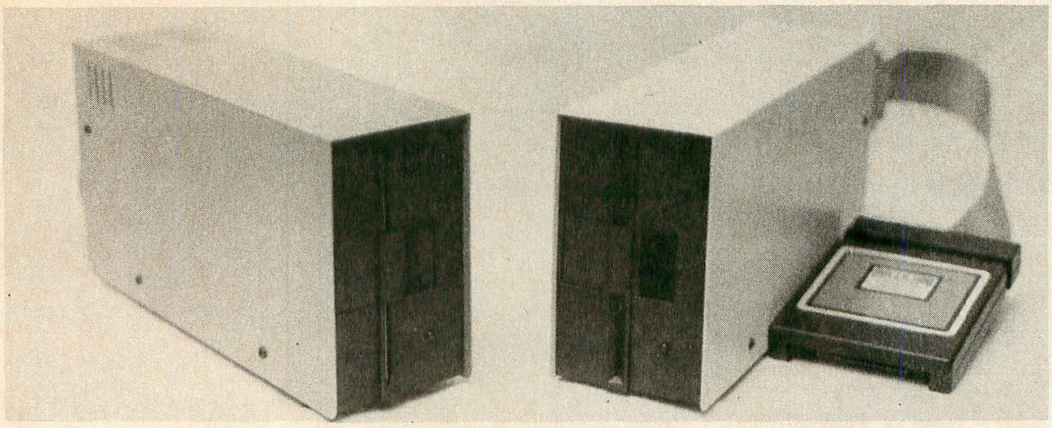

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```
    PRINT "                   7 -- Execute Shell Command"
    PRINT "                   0 -- Return to Selection Menu"
    PRINT
    INPUT "                       Selection : ",resp
  EXITIF resp=0 THEN
    RUN clearscreen
  ENDEXIT
    IF resp=1 THEN RUN creat(label,index,listfile,indexfile)
      KILL creat
    ELSE IF resp=2 THEN RUN updat(label,index,listfile,indexfile

        )
        KILL updat
      ELSE IF resp=3 THEN RUN disp(label,index,listfile,indexfile

          )
          KILL disp
        ELSE IF resp=4 THEN RUN prnt(label,index,listfile,indexfile

            )
            KILL prnt
          ELSE IF resp=5 THEN RUN make(label,index,listfile,indexfile

              )
              KILL make
            ELSE IF resp=6 THEN RUN one(label,index,listfile,
                indexfile)
                KILL one
              ELSE IF resp=7 THEN RUN shellcommand
                ELSE RUN entryerror
                ENDIF
              ENDIF
            ENDIF
          ENDIF
        ENDIF
      ENDIF
    ENDIF
  ENDLOOP
  END
```

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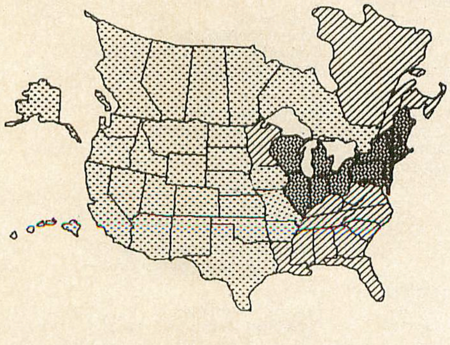

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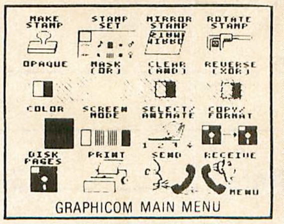

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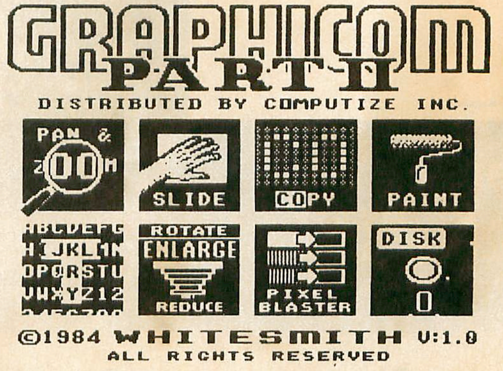

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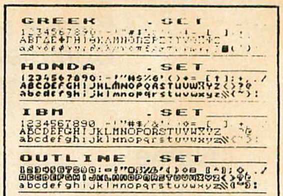
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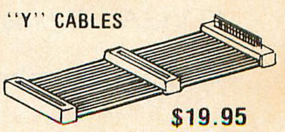

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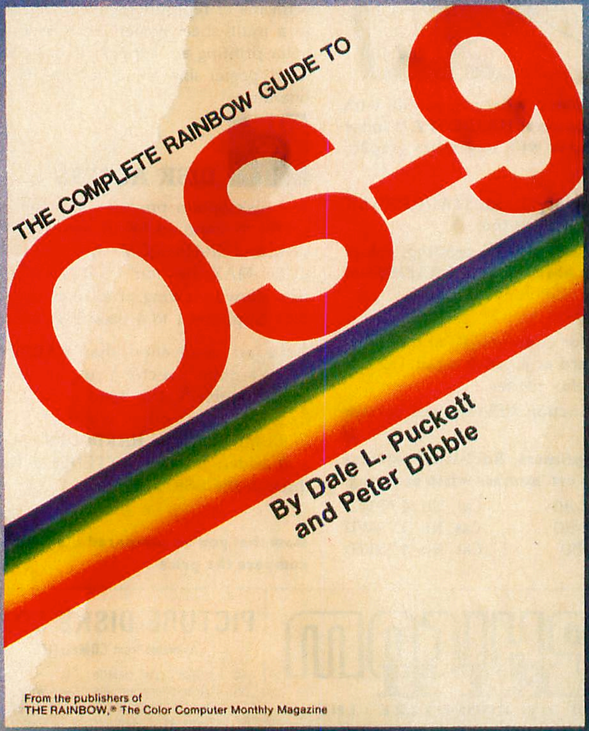
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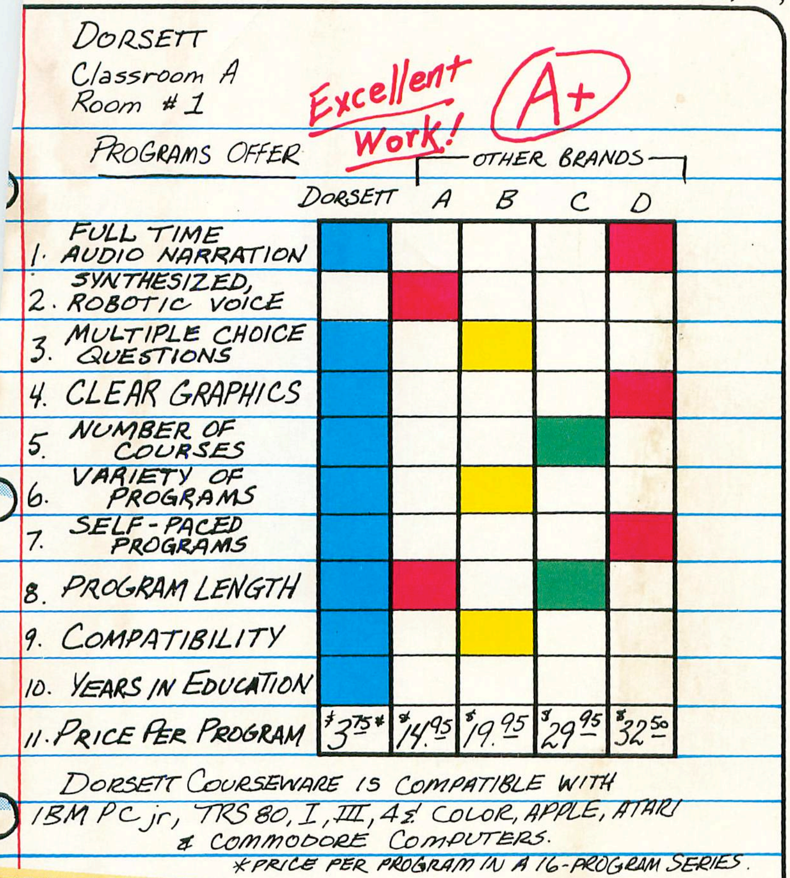

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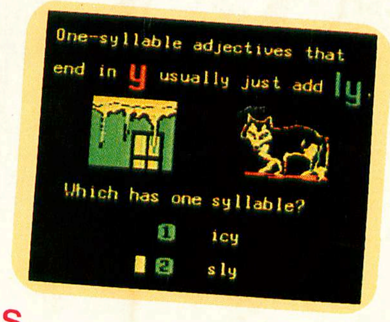

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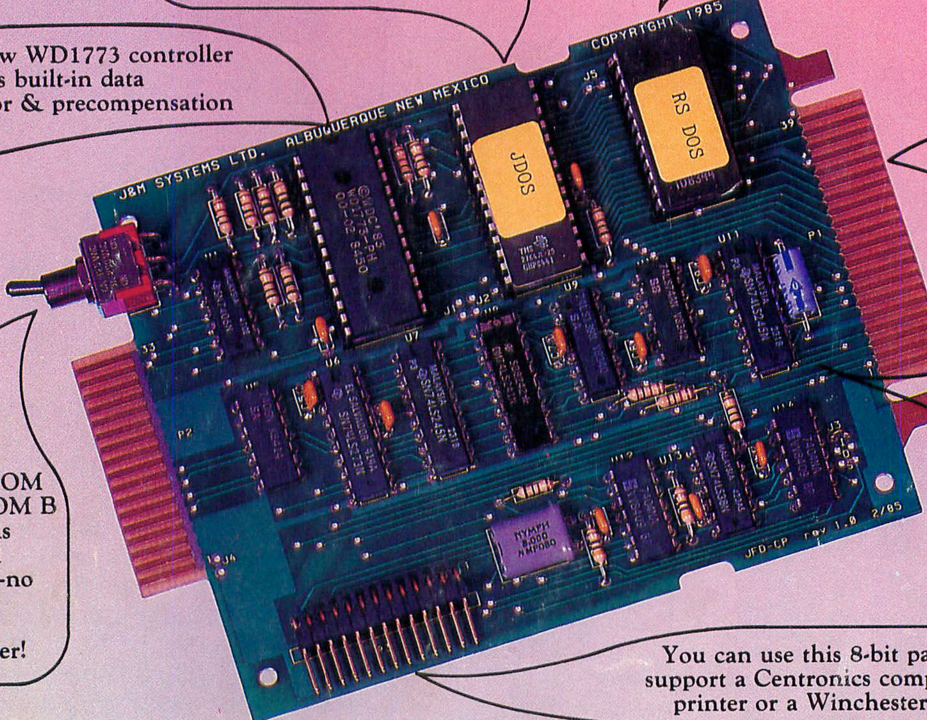

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